

Graduate Education Bulletin

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of the Health Sciences

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Mission

The Uniformed Services University of the Health Sciences is the Nation's federal health science university and is committed to excellence in military medicine and public health during peace and war. We provide the Nation with health professionals dedicated to career service in the Department of Defense and the United States Public Health Service and with scientists who serve the common good.

We serve the Uniformed Services and the Nation as a outstanding academic health sciences center with a worldwide perspective for education, research, service, and consultation; we are unique in relating these activities to military medicine, disaster medicine, and military medical readiness.

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GENERAL INFORMATION

The Uniformed Services University of the Health Sciences was established by the 92nd Congress. It was the 25 year effort of Congressman F. Edward Hébert (D-LA) that led to the Congressional passage of legislation to create the Uniformed Services University of the Health Sciences in 1972. It was established to provide a comprehensive education in medicine to select young men and women who demonstrate potential for and commitment to careers as Medical Corps Officers in the Uniformed Services. The University is organized under the Department of Defense, and is governed by a Board of Regents composed of 14 members prominent in the fields of health and education who are appointed by the President with the advice and consent of the Senate. Congressional legislation officially designated the School of Medicine of the Uniformed Services University of the Health Sciences as the F. Edward Hébert School of Medicine (hereinafter referred to as "the School of Medicine" or "the School").

The University's developmental progress has been marked. The School of Medicine admitted its charter first-year class of 32 students in the Fall of 1976. This was just four years after the passage of the legislation creating the University. Sixty-eight medical students were admitted in 1977 and 108 in 1978. In 1979, the School matriculated an entering class of 124 freshman medical students. In 1980 the School matriculated an entering class of 130. Since 1981 the School of Medicine has matriculated an entering class of 156. The School of Medicine has been accredited for an entering class of 176 by the Liaison Committee on Medical Education. The University and the School of Medicine are also accredited by the Middle States Association of Colleges and Schools Commission on Higher Education.

The Graduate Program in the Biomedical Sciences has grown steadily since the first graduate students were admitted in 1977. Presently there are 124 graduate students enrolled in Doctoral and Master's programs in the basic medical sciences.

Facilities

Construction of the permanent facilities of the University began on July 10, 1975. It was built in two separate but overlapping increments at a total cost of approximately 72 million dollars. Increment I, which was completed in August 1977, is a clinical science building containing multi-discipline laboratories, research facilities, classrooms, and administrative offices and features 170,000 gross square feet of space. Increment II, a complex of approximately 345,000 gross square feet of space, was started in April 1976, and was finished in the Fall of 1979. This increment containing basic science laboratories and offices, research facilities, classrooms and the learning resource center completes the physical plant of the School of Medicine, enabling it to accommodate a total enrollment of over 800 medical and graduate students.

Faculty

Faculty of the School of Medicine is composed of both civilians and military officers who have achieved national recognition in their own

specialized areas as well as in medical education. The mix with civilians and military is not rigid. Students can expect to be exposed to both military and civilian faculty at all levels of instruction.

The Associate Dean for Graduate Education, and Department Chairpersons of the School of Medicine are responsible for student education and for working in close cooperation with the Surgeons General of each of the Uniformed Services and Medical Center commanders to assure the adequacy of clinical and investigative programs required in support of an educational program of the highest quality.

A Graduate Education Committee, appointed on an annual basis, is responsible for developing University policy concerning graduate training. The committee is composed of a representative from each of the Basic Science Departments plus two members of the Faculty Senate. The Associate Dean for Graduate Education, Associate Dean for Teaching and Research Support, and an elected graduate student representative are also members.

The Associate Dean for Graduate Education is responsible for the overall administration of the graduate programs. All applications for graduate study, regardless of the type of program, must be processed through the Office of the Associate Dean for Graduate Education. Application forms, supporting documents, and requests for information should be mailed to:

Associate Dean for Graduate Education
Uniformed Services University of the Health Sciences
4301 Jones Bridge Road
Bethesda, Maryland 20814-4799
Telephone: 1-800-772-1747 (Toll free number)
Internet Address: www.usuhs.mil

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Graduate Education in the Basic Medical Sciences

Public Law 92-426 established the Uniformed Services University of the Health Sciences with authority to grant appropriate advanced degrees.

It is recognized by the Board of Regents that predoctoral graduate programs in the basic medical sciences leading to the Doctor of Philosophy Degree or to appropriate degrees at the Masters level are essential components of a School of Medicine dedicated to excellence in medical education. Accordingly, graduate programs are offered in Anatomy and Cell Biology, Biochemistry, Clinical Psychology, Medical Psychology, Microbiology and Immunology, Molecular and Cell Biology, Neuroscience, Pathology (Comparative Pathology and Molecular Pathobiology), Pharmacology, Physiology and Preventive Medicine and Biometrics. Graduate programs in the basic medical sciences benefit the USUHS and the Department of Defense in that:

The academic environment of the School of Medicine will be maintained at a high level exposing physicians-in-training to the disciplined methods of critical scientific inquiry that are the rational basis of problem solving in medical science;

Graduate students will be appointed as graduate fellows and will assist in the performance of instructional and investigative efforts that are essential to the mission of the School of Medicine;

The graduate programs will provide training opportunities for qualified active duty personnel of the Uniformed Services who receive authorization to participate in graduate training programs under the sponsorship of their parent services;

Graduate students will have the opportunity to become aware of the outstanding investigative programs that are ongoing in Department of Defense laboratories in the Washington area and it is anticipated that the Research Institutes within the Department of Defense will be able to recruit well qualified graduates on the basis of mutual knowledge and respect arising from previous favorable interaction; and a limited number of graduates may ultimately be recruited back into faculty positions.

The goal of graduate study in the basic medical sciences at USUHS is to develop independent scholarship, originality, and competence in research, in teaching, and in professional service. The graduate education programs are designed for outstanding students with a strong commitment to permanent careers in the basic medical sciences. Within each Ph.D. program, an individualized course of study is designed for each graduate student to meet his or her specific needs.

The graduate program is open to qualified civilian and military personnel. Students accepted for postgraduate work are enrolled on a full-time basis. They are designated as graduate students and will

assist in the performance of instructional and investigative efforts that are essential to the mission of the School of Medicine of the University.

Active duty military/uniformed services personnel must obtain the approval and sponsorship of their parent department and will incur an obligation for additional service in accordance with that department's regulations governing sponsored graduate education.

Research Facilities

The graduate training programs in the basic medical sciences are conducted in facilities on the campus of USUHS. Well-equipped, modern laboratories are available to support the wide variety of research projects directed by the faculty in the basic medical sciences. Special resources include high resolution transmission and scanning electron microscopes, biohazard containment laboratories, a centralized animal resources facility, computer support and library.

Selection of Students

A formal application is required of all persons seeking admission to graduate study at USUHS. Applications and all supporting documents must be received no later than 15 January for programs commencing the following August. Application forms and detailed information concerning graduate study may be obtained from the Office of the Associate Dean for Graduate Education, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, Maryland 20814-4799.

Each applicant must complete a baccalaureate degree program from an accredited academic institution before matriculation at USUHS. Complete college transcripts, transcripts of all previous graduate studies, a complete employment history, three letters of recommendation from faculty members under whom the applicant has studied, and the aptitude portion of the Graduate Record Examination, taken no more than two years before the time of application, are required. Individual programs may also require Advanced Graduate Record Examinations in one or more subject areas and may establish requirements for specific college courses. USUHS gives careful consideration to all available information about each applicant and selects students on a competitive basis without regard to race, color, sex, creed or national origin.

Applicants to USUHS should distinguish the School of Medicine Doctor of Medicine Program from the Graduate Education Programs in the Basic Medical Sciences. Students who aim to become military physicians should apply for admission to the Doctor of Medicine Program, while those who desire advanced education in the basic medical sciences should apply for the Graduate Education Program. A student who enrolls in a Graduate Education Program at USUHS is expected to pursue studies therein until completion of the requirements for a graduate degree. A graduate student at USUHS will not be considered for admission to the Doctor of Medicine Program at USUHS until the requirements for the graduate program in which he or she was initially enrolled have been fulfilled.

Cost of Study

Graduate students tuition is waived. All graduate students will be obligated to participate on a full-time basis and to assist in teaching and research programs that are integral components of the graduate education program in which they are enrolled. A limited number of

compensated positions are available for civilian graduate students. Only United States citizens will be eligible for direct USUHS compensated positions. These compensated positions will be filled on a competitive basis based on recommendations of the directors of the respective training programs and with the approval of the Associate Dean for Graduate Education. The compensation will be comparable with the support provided to graduate students at other universities in the geographic area serving as the data base for USUHS. Civilian graduate students will not incur service obligations to the United States Government after completion of their graduate training program.

Health Insurance

All civilian graduate students admitted to graduate study must demonstrate proof of health insurance coverage prior to matriculation. Students being offered admittance into the graduate program must show proof of health insurance, whether covered by a spouse, parents, or individually, or pick up the insurance offered by FAES, NIH. Insurance will be mandatory and will be annually checked to insure compliance.

Cost of Living

Housing costs in the greater Washington area are somewhat higher than other major metropolitan areas but living costs for items other than housing approximate those found in cities of comparable size. USUHS will provide every assistance to students in making arrangements for housing since student housing is not available.

The Community

The legislation that established the University required that the main campus of the Institution be within 25 miles of the District of Columbia. The site selected for the University is at the National Naval Medical Center, a spacious and attractive location in Bethesda, Maryland. The Campus is close to several major Federal health facilities including National Institutes of Health, the National Library of Medicine, the Walter Reed Army Medical Center, National Naval Medical Center, Bethesda, the Armed Forces Institute of Pathology, and the Armed Forces Radiobiology Research Institute. Through various affiliation agreements, these institutions will provide additional resources to enhance the educational experience of graduate students at USUHS.

Washington, D.C. has a wide variety of cultural and recreational opportunities and a modern Metro system of transportation gives easy accessibility. A number of other universities, colleges, and research institutions are located in or near the city.

Administration

President of the University
James A. Zimble, M.D.

Dean of the School of Medicine
Val G. Hemming, M.D.

Associate Dean for Graduate Education
Michael N. Sheridan, Ph.D.

Graduate Program Coordinator
Janet M. Anastasi

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Graduate Degree Requirements

Master's Degree Requirements

In addition to the following requirements, special departmental requirements may be imposed. The student should be certain to check with the department regarding special requirements.

Program and Course Requirements

The minimum residency requirement shall be 12 months of full-time graduate study. The minimum requirement for formal course work shall be 32 credit hours and the minimum requirements for total academic credit shall be 48 credit hours. "Full-time graduate study" and credit hours are defined among the requirements for the Ph.D. degree.

The academic content of several basic sciences and clinical sciences courses includes participation in laboratory experiences which may involve the use of laboratory animals. Participation in these laboratories is mandatory. Failure to participate in these laboratories will result in sufficient grounds for course failure and review by the Graduate Education Committee and potential disenrollment as discussed in this section.

A written thesis approved by a committee composed of three members of the graduate faculty will be required of all candidates for the Master of Science degree. For other programs leading to different degrees at the masters level (such as Master of Public Health), a written thesis subject to similar faculty approval may or may not be required. Additional requirements may be established for programs leading to specific degrees at the masters level. Publications will not be accepted in lieu of a written thesis.

Transfer of Credit

Academic credit for formal courses taken by a USUHS graduate student at another institution, either before or after the student initiates a program of graduate study at USUHS, may be transferred for credit and used toward fulfillment of degree requirements at USUHS, provided that such courses are comparable to graduate level courses at USUHS, and at the discretion of the graduate faculty of the department in which enrolled. However, transfer of credit will require the approval of the Graduate Education Committee, acting on the recommendation of the appropriate graduate program faculty. Students who have satisfactorily fulfilled the minimal requirements for academic credit are eligible to maintain matriculation while completing other requirements for the degree.

Due to academic and procedural differences between U.S. regionally accredited and foreign institutions, credit from foreign universities is not normally acceptable for transfer.

The grades on transfer do not affect the grade point average of work taken at the Uniformed Services University. A grade of "A" from another institution cannot balance a "C" on a course here.

The request for transfer of credit shall be submitted to the Associate Dean for Graduate Education for approval at the earliest possible time.

The candidate is subject to final examination by USUHS in all work offered for the degree.

Deadlines For Graduation

The student should be aware of the various deadlines for the final requirements in the academic quarter in which he or she expects to graduate.

Doctoral Degree Requirements

In addition to the following requirements, special departmental requirements may be imposed. Students should be certain to check with the department regarding any special requirements.

Program and Course Requirements

The minimum residency requirements for the Ph.D. degree will be 36 months of full-time graduate study. No student will receive financial support from USUHS appropriated funds as a predoctoral teaching/research assistant for a total period of more than four years. All requirements for the Ph.D. degree must be completed no later than seven years after initiating the program of graduate study at USUHS. For individuals who possess a relevant advanced degree (M.D., D.V.M., D.D.S., M.S., etc.) and who have successfully completed most of the formal graduate level courses required for the Ph.D. degree before admission to graduate study at USUHS, an exemption from the 36 months minimum residency requirement may be considered by the graduate faculty of the department in which enrolled. Each case will be decided individually on its merits, and an exception may be granted only with the approval of the Graduate Education Committee acting on the recommendation of the appropriate graduate program faculty.

Formal course work, participation in USUHS School of Medicine teaching programs as research fellows or senior research fellows, directed research, and participation in other academic activities in approved programs of graduate study are all components of the predoctoral graduate education program at USUHS. Academic credit will be given for participation in these activities. Full-time status for trainees in graduate education programs will be defined as 12 or more credit hours per academic quarter.

The academic content of several basic sciences and clinical sciences courses includes participation in laboratory experiences which may involve the use of laboratory animals. Participation in these laboratories is mandatory. Failure to participate in these laboratories will result in sufficient grounds for course failure and review by the Graduate Education Committee and potential disenrollment as discussed in this section.

The minimum requirement for formal course work will be 48 credit hours, and the minimum requirement for total academic credit will be 144 credit hours.

Language/Computer Science Requirement

A reading knowledge of one foreign language or the demonstration of proficiency in computer science may be required based on one's program of study. This is a departmental option to be determined by the department based on the needs of the individual student in relation to his or her program of study.

Qualifying Examination

The qualifying examination for each approved program of study shall be conducted and graded by a committee consisting of a minimum of four graduate faculty members at the rank of assistant professor or above. Three members must be from the department and have a primary academic affiliation in the graduate program for which the degree is to be granted. The fourth member may hold either a faculty position in the department or in another department at USUHS or have an appointment outside of USUHS. Additional members if desired, may either hold a faculty position at USUHS or have an appointment outside of USUHS. The majority of the Committee must always have full-time appointments at USUHS and be members of the Department granting the degree. The Examination Committee shall be appointed by the director of the graduate program for which the qualifying examination is given.

Advancement to Candidacy

Aspirants for the Ph.D. degree must complete all requirements for advancement to candidacy no later than two years of attendance after initiating a program of study at USUHS, unless they are granted an exception recommended by the Chairperson of their department and approved by the Graduate Education Committee. The Graduate Education Committee may approve a delay for a period not to exceed one year. These requirements include the language/computer science requirement (departmental option), the minimal requirement of 48 credit hours of formal course work at the graduate level, a cumulative grade point average of 3.0 (B), and successful completion of the qualifying examination. When these requirements have been met, the program director shall submit to the Associate Dean for Graduate Education via the departmental chairperson a request for advancement which indicates successful completion of language/computer science courses (if required), and documentation of successful completion of the qualifying examination including the dates of the examination, and description of the format of the examination, and the grade given on the examination. Final approval of advancement to candidacy shall rest with the Associate Dean for Graduate Education acting on the recommendation of the appropriate graduate program faculty.

Deadlines For Graduation

The student should be aware of the various deadlines for the final requirements in the academic quarter in which he or she expects to graduate. All graduate students expecting to graduate in any given academic quarter must make application in the Office of Graduate Education by the deadline date for the diploma in that academic quarter.

Dissertation

A written dissertation based on the original experimental research will be required of all aspirants for the Ph.D. degree in any of the basic medical sciences. An alternative thesis may be submitted in lieu of the standard dissertation. Both formats can be obtained from the Graduate Education Office.

Final Examinations

An Examination Committee will be formed to read the dissertation, to certify its acceptability as to scope and quality, and to conduct the defense of the dissertation. The defense of the dissertation will consist of a public seminar followed by an oral examination. The oral examination will be closed to the public and will be conducted by an

Examination Committee. The Examination Committee for Ph.D. degree candidates must be composed of at least four persons with doctoral degrees. At least three of these must be graduate faculty members at the rank of Assistant Professor or above with a primary academic affiliation in the Graduate Program for which the degree is to be granted. A fourth member of the Committee must be from another department at USUHS with no appointment in the primary graduate department. Additional members may either hold a faculty position at USUHS or have an appointment outside of USUHS. Outside appointments will be recommended by the Departmental Graduate Affairs Committee and must be approved by the department chairperson. The majority of the Committee must always have full-time appointments at USUHS, and be members of the department granting the degree. The chairperson of the Examining Committee shall be appointed by the Associate Dean for Graduate Education and may be any eligible member of the graduate faculty other than the candidate's faculty mentor. The other members of the Committee shall be appointed by the director of the graduate program for which the degree is to be granted. The results of this examination with the signatures of the members of the Examination Committee certifying the student's qualifications for the degree shall be transmitted to the Associate Dean for Graduate Education. Following review and approval by the Dean of the School of Medicine, the Dean will recommend to the Board of Regents that the Ph.D. degree be awarded.

Graduate Student Grading, Promotion, and Dismissal Procedures

Standards of performance and procedures regarding academic status for graduate students are contained in USUHS Instruction No. 1306 "Academic Standing of Graduate Students" of 4 January 1996. A summary of these standards is as follows:

- Satisfactory academic standing is defined as a cumulative grade point average of B (3.0), with no grade below "C" in any course.

- Satisfactory academic standing is determined both by performance in formal courses and by the aspects of academic performance, including skills, attitudes and attributes judged by the graduate faculty to be important for success as a basic medical scientist. These include factors such as honesty, integrity, reliability, perception, balanced judgment, personal insight, and the ability to relate to others.

Graduate students will be referred to the Graduate Education Committee for review for any of the following reasons:

- 1) When a final grade of "D" or "F" is received in any course.
- 2) When the cumulative grade point average is below 3.0 at the end of the third academic quarter or any time thereafter.
- 3) For failure to maintain appropriate academic standing or violation of academic integrity.

Following review, the Graduate Education Committee may recommend:

- 1) Dismissal.
 - 2) Appropriate remedial action within a specified period of time.
- NOTE: A grade of F will not be allowed to stand unremediated on a graduate student's transcript regardless of the student's overall academic performance. If a grade of D is received in a course, the

Committee may require remedial work depending upon the student's overall academic performance. Grades for the original course and the remedial work will both remain on the student's transcript. In calculating the cumulative GPA, the original D or F and the grade for the remedial work will be averaged, and the averaged grade will be applied to the number of quarter credit hours for the original course to calculate the final grade point average.

3) Other action appropriate to the specific cause under review.

Any student reviewed by the Graduate Education Committee and found to be academically deficient will either be recommended for dismissal or placed in a probationary status until a satisfactory academic standing is achieved. Specific details of these policies can be obtained from the Office of the Associate Dean for Graduate Education.

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Graduate Degree Program in Anatomy and Cell Biology

The Department of Anatomy and Cell Biology offers academic and research training leading to the Ph.D. degree. The graduate program is designed to provide students with an opportunity to pursue advanced studies in cellular, developmental, and molecular biology and neurobiology. It is intended to form the basis for a career in research and teaching.

The Department of Anatomy and Cell Biology's objectives are to train students in techniques of biological research and to foster an understanding of the basic principles essential to the formulation, pursuit and completion of scientific studies. While the main thrust of the graduate program is aimed at research training, development of teaching skills will also be emphasized.

Research programs within the Department of Anatomy and Cell Biology focus on fundamental biological problems, many of which have clear consequences for future solutions to important medical problems including neurodegenerative disorders, such as Multiple Sclerosis, Parkinson's Disease and Alzheimer's Disease. Studies within the Department are focused on the regulation of neuronal gene expression, biological clock mechanisms, neuroendocrine secretory processes, the role of glial cells in CNS injury and disease, neuronal regeneration and plasticity, cell therapy using engineered cells, and gene therapy using viral and chemical vectors. A substantial investment has been made towards development of molecular and genetic approaches to understanding metabolic disorders, such as cystic fibrosis and diabetes. The molecular and genetic approaches used to study the genes involved in these diseases include cellular systems, and knock-out and transgenic mouse models. The Department's Institute for Molecular Medicine provides a university-wide focus for translating fundamental bedside insights to the clinical bedside.

Admission Requirements

Applicants for admission must satisfy all of the University requirements for admission.

Program of Study

The program of study is divided into course work in anatomy, biochemistry, molecular and cellular biology and physiology and research toward the Doctor of Philosophy (Ph.D.) degree. The first year will include course work and participation in research experiences in 3 laboratories chosen by the student. If a student begins his or her program of study in either department with a research advisor identified, research experiences in three laboratories will not be required. During the first year the student will be assigned an academic advisor from the Anatomy and Cell Biology. If a student has identified a research mentor upon beginning their course of study, the research mentor will serve as the student's academic advisor.

Academic Advisors

During the first year, new students in the Department of Anatomy and Cell Biology will be assigned an academic advisor. The faculty member who will be assigned this role must be a graduate faculty member. This assignment will be made randomly by drawing names of the available graduate faculty members. Available faculty members are defined as members of the graduate faculty of the Anatomy and Cell Biology Department who are not currently advising a student in their Graduate Program. When a faculty member has been chosen as an academic advisor, his/her name will be removed from the available pool of graduate faculty members until all available graduate faculty members have served as academic advisors. If a student has identified a research mentor at the beginning of their graduate study, the research advisor will serve as the student's academic advisor. The students and their academic advisors will meet at least once a year with the members of the departmental GAC to inform the GAC about the student's progress and any impending problems.

Course Requirements

Graded Core Courses

1. Choose one of the major Anatomy Courses (Anatomy and Cell Biology Graduate Students) or Medical Physiology (Physiology Graduate Students)
2. Scientific Methods & Laboratory Techniques I
3. Scientific Methods & Laboratory Techniques II
4. If a student has not had computer training in a course approved by GAC: Introduction to Computers
5. Anatomy and Cell Biology Graduate Students are required to take two semesters of Cell Biology while the Physiology Graduate Students can choose two semesters of Cell Biology or Pharmacology:
6. If a student has not had Biostatistics (in a course approved by GAC), biostatistics is required.
7. If a student has not had Genetics (in a course approved by GAC), genetics is required.
8. If a student has not had Biochemistry (in a course approved by GAC), biochemistry is required.
9. Graduate Students in the Department of Physiology will also be required to take History of Physiology and 2 of the Advanced Topics in Physiology Courses.
10. Tutorial in Anatomy or Special Topics in Physiology. Students will sign up for this course during their third and fourth years and possibly during their second year. Credit will be given for presenting research in the form of a poster or talk at a local, national or international meeting.

Non-Graded Core Courses

1. Seminar
2. Research
3. Ethics and Responsible Conduct of Research

The remaining 48 graded credit hours may be completed by selecting any other graded courses given at USUHS or FAES that are recommended and approved by the student's academic advisor and the GAC.

Research Experience

During the Fall Quarter of the first year all new students in the Department of Anatomy and Cell Biology will be required to take the

Scientific Methods and Laboratory Techniques 1 Course. This course will serve to introduce the new students to the members of the faculty of the Anatomy and Cell Biology Department and their research programs. The students can then make a knowledgeable decision in choosing faculty members for their three research experiences. For each of these research experiences, the students will register for Scientific Methods and Laboratory Techniques II. The first of three laboratory experiences will begin during the Winter quarter. The Winter and Spring quarter experiences will last 12 weeks. The Summer quarter experience will last 6 weeks since the student will be spending at least twice as many hours per day in the laboratory. By the end of the Summer quarter of the first year, the student will have completed his/her research experiences and have chosen a research advisor.

Before the completion of each laboratory experience, the student will be required to write a research proposal on a topic related to the research interests of the laboratory mentor. The proposal will use a modification of the USUHS grant proposal format. This exercise will train students to design hypotheses and experiments, and to express their ideas in a grant format. This experience will provide the students with critical practice for their qualifying examination which will use a modification of form PHS 398 as the format. The students will receive a grade for 2 Qtr Hrs for their effort after each research experience. This grade will be determined by the faculty member in whose laboratory the student is working and will be based on attendance (a minimum of 6 hours per week) and performance in the laboratory (50%) and the quality of their proposal (50%). If a student begins his or her program of study with a research mentor identified, rotations in 3 laboratories will not be required. However, the student will still be required to write 3 proposals (on different topics) and will be strongly encouraged to carry out at least one research experience in another laboratory and to write one of the required proposals in conjunction with that laboratory experience.

Teaching Requirements

Since experience in teaching is considered an integral part of the Anatomy and Cell Biology Graduate Program, students in the Anatomy and Cell Biology Graduate Program will be required to participate as teaching assistants in one of the Anatomy Blocks (defined as Blocks 1 and 4, Block 2 or Block 3). A student may elect to be a teaching assistant in the same course more than once or to assist in other courses given at USUHS. Consent of the research advisor will be necessary for participation in any teaching beyond the minimal requirement. Students will receive non-graded credit for their participation each time they teach in a course.

Seminar Requirements

Since organization and presentation of data and speaking skills are essential to every researcher, all students in the Anatomy and Cell Biology Graduate Program will be required to present yearly seminars and to attend all seminars presented in the Anatomy and Cell Biology and Physiology Seminar Series. The student seminars will be scheduled in the Spring quarter of the first year and Winter quarter of the second year (so as to not conflict with the qualifying examination). The topic of the seminar will be selected by the student and his/her academic or research advisor. The student will receive a 1 Qtr Hr graded credit for the quarter that they present their seminar. This grade will be given by the Chair of the GAC for the Department of Anatomy and Cell Biology

with input from the student's academic or research advisor.

Interim Evaluation by GAC

Academic advisors will report annually to the members of their departmental Graduate Advisory Committee (GAC). By the end of the first year, the student will have chosen a research advisor for their doctoral research. If at the end of the first year, the student does not have a G.P.A. of 3.0 or better, the student will appear before the GAC for evaluation. The GAC will consider the student's case. If the G.P.A. is such that it could not be remediated by the end of the following Spring quarter, the student will be disenrolled.

G.P.A. Requirements and Conditions for Disenrollment

Since all full time graduate students must complete their 48 graded credit hours with a G.P.A. of 3.0 or better, complete their qualifying examination and advance to candidacy by the end of their second year, students must complete a minimum of 24 graded credit hours by the end of the Spring quarter of their first year. This number of completed credit hours is necessary for the GAC to assess the students progress and status and to report the status of the student to the GEC at the end of the first year. If at the end of the first year, the student does not have a G.P.A. of 3.0 or better, the student will appear before the GAC. The GAC will consider the student's case. If the G.P.A. is such that it could not be remediated by the end of the following Spring quarter, the student will be disenrolled. Every student's G.P.A. must be maintained at 3.0 or better or the student will appear before the GAC for consideration of his/her disenrollment.

Qualifying Examination

Before the end of the Spring quarter of the second year, the student will take his/her Qualifying Examination. The examination will consist of the preparation and defense of a grant proposal on one of three topics presented to the student. The exact time of the examination will be determined by the student's research advisor and the Graduate Program Director but it must be completed by the end of the second year.

A Qualifying Examination Committee will administer the examination and evaluate the student's performance. The Qualifying Examination Committee will consist of five faculty members from the graduate student's department. The student's research advisor will serve on this committee but will not act as the Chairperson of the committee. The student and his/her research advisor will determine the members of the committee and provide this list of names to the GAC for approval at the beginning of the Winter quarter of the second year. The Chair of the GAC will appoint one of the members of the committee to act as Chairperson. The Chairperson of the committee will be responsible for organizing and administering the examination. The Chairperson will convene the examination committee once it is formed and examination schedule has been established.

The committee will determine three topics to be presented to the student early in the Spring quarter of the second year. These topics will not include the student's topic of research but they may be related to the research topic. There should be no overlap of the three topics.

In a subsequent seven week period, the student must select one of the three topics, research the topic, and write the research proposal.

Although the student will be given three weeks to choose and research one of the topics, he/she will be strongly encouraged to choose their topic by the end of the first week. When the student has chosen his/her topic, he/she should inform the chairperson of the Examination Committee. This time frame provides the student with 4-6 weeks to write the grant proposal on the selected topic. The student will develop a research plan that meets the criteria defined in form PHS 398. The student will be allowed 25 pages to develop their research plan. The research plan will include 3 parts: a) Specific Aims (one page is recommended); b) Background and Significance; and c) Research Design and Methods. The pages normally devoted to the Preliminary Results/Progress Report section should be used for a comprehensive Background and Significance section. The student must include a Literature Cited section but this section is not part of the 25 pages used for the Research Plan. The student's research advisor may not be involved in the preparation of the proposal. The scientific content and organization of the proposal are the responsibility of the candidate. Advice and guidance on the preparation of the proposal will be provided by the Chairperson of the Examination Committee.

On or before the due date, the student will distribute copies of the proposal to all members of the examining committee. Committee members are expected to evaluate the proposal within one week. Each member of the committee will determine if the student passed or failed the written part of the examination and inform the Chairperson in writing. If a member of the Examination Committee fails the student on the proposal, they must state in writing the reasons for the failing grade. If the majority of the Examination Committee agrees that the proposal is satisfactory, the student will be permitted to take the oral part of the examination within two weeks from the date the student had distributed the proposal to his/her committee.

If a majority of the Committee members find the proposal unsatisfactory, the student will be deemed to have failed and will not take the oral section of the examination at this time. If a student fails the written part, it may be repeated once and the oral part must be passed on the first attempt. If a student fails the written portion of the examination, he/she will be given two weeks to rewrite the proposal. If a majority of the Committee members find the rewrite unsatisfactory, the student will be deemed to have failed the qualifying examination a second time and the student will be dismissed from his/her respective graduate program.

If a student passes the written part on the first attempt, he/she will have two tries to pass the oral part of the examination. The oral examination shall be retaken with the same Examination Committee within a period of two weeks. The Director of the GAC or a member of the GAC appointed by the Director will observe the oral examination. After the oral examination, the student will be asked to leave the room and the members of the Examination Committee will vote on the student's performance. The decision of the Committee will be made by majority vote. The Chairman of the Qualifying Examination Committee will provide the Chair of the GAC with a written report on the examination and the Committee's decision. A student who has failed the oral part of the Qualifying Examination twice will be recommended for dismissal from the program.

Advancement to Candidacy

During the second year, after the student has completed 48 graded credit hours with a G.P.A. of 3.0 or better, and passed the qualifying examination, he/she will be advanced to candidacy. A completed Report Of The Advisory Committee must be sent to the Associate Dean for Graduate Education before the student is officially advanced to candidacy. After advancement to candidacy, if the student has not already done so, he/she will: 1) write their research proposal within six months, and 2) form and meet with their research committee.

Research Committee and Thesis Examination Committee

The members of the Research Committee will also serve as the students Examination Committee for defense of the dissertation. Therefore, when the student chooses the members of his or her Research Committee, the student should follow the rules of the University which govern the makeup of the Examination Committee. The Examination Committee for Ph.D. degree must be composed of at least four persons with doctoral degrees. At least three of the members of the committee must be graduate faculty members with a rank of Assistant Professor or above and have a primary academic appointment in the students respective Department. A fourth member of the Committee must be from another department at USUHS with no appointment in the primary graduate department. Additional members may serve on the committee and may either hold a faculty position at USUHS or have a faculty appointment outside of USUHS. All thesis examination committee appointments must be approved by the GAC.

Research Proposal

The research proposal will be written using a suitable grant format (PHS, NSF, or other viable funding organization) chosen by the student and his/her research advisor and approved by the GAC. The research proposal must be completed and the first meeting of the Research Committee be convened within 6 months of advancement to candidacy. At the initial meeting the research committee will discuss, modify, approve or reject the student's research proposal. A written summary of this initial meeting and its results will be submitted by the Chairperson of the Research Committee to the GAC. The research proposal must be approved by the Research Committee within one year of advancement to candidacy. The members of the Research Committee will meet with the student and his/her research advisor every 4 to 6 months after the initial meeting.

If a student and his/her research advisor realize that the research proposal will not be completed within the 6 month time period, the student and his/her advisor must meet with the members of the GAC by the end of the fifth month. The student and his/her advisor should be prepared to discuss the circumstances causing the delay and to submit a revised deadline for completion of the research proposal. The submitted schedule must be approved by the members of the GAC. A student will be allowed to delay completion of his/her proposal only once. If a student delays completion of his/her research proposal and does not complete the research proposal on schedule, the student and his/her research advisor will meet with the GAC to consider withholding the student's stipend until the research proposal is complete.

Dissertation

A written dissertation based on original experimental research will be required of all candidates for the Ph.D. degree. The defense of the dissertation will consist of a public seminar followed by an oral examination. The oral examination will be closed to the public and will be conducted by an Examination Committee. The results of this examination with the signatures of the members of the Examination Committee certifying the student's qualifications for the degree will be transmitted to the Associate Dean for Graduate Education. Following review and approval by the Dean of the School of Medicine, the Dean will recommend to the Board of Regents that the Ph.D. degree be awarded.

Faculty

Harvey B. Pollard, M.D., Ph.D.

(University of Chicago School of Medicine, 1969,
University of Chicago, 1973)
Professor and Chair, Department of Anatomy and Cell Biology

Adelman, Mark R., A.B., Ph.D.

(Princeton University, 1963; University of Chicago, 1969)
Associate Professor of Anatomy and Cell Biology

Agoston, Denes v., M.D., Ph.D.

(University Medical School Szeged, Hungary, 1976; Max-Planck-Institute
for Biophysical Chemistry, Göttingen, Germany; Hungarian Academy of
Sciences, Budapest, Hungary, 1992)
Associate Professor of Anatomy and Cell Biology

Anders, Juanita J., B.A., M.S., Ph.D.

(Wilkes College, 1969; Pennsylvania State University, 1972;
University of Maryland, 1977)
Associate Professor of Anatomy and Cell Biology
Graduate Program Director

Arispe, Nelson J., Ph.D.

(Central University of Venezuela, 1963; Central University of Venezuela,
1964; Duke University, 1968)
Research Professor of Anatomy and Cell Biology

Armstrong, Regina C., B.S., Ph.D.

(University of Rochester, 1982; University of North Carolina, 1987)
Associate Professor of Anatomy and Cell Biology

Borke, Rosemary C., B.S., Ph.D.

(Mary Washington College, 1961; George Washington University, 1979)
Professor of Anatomy and Cell Biology

Borst, Diane E., B.A., Ph.D.

(Goucher College, 1973; University of Pennsylvania, 1984)
Assistant Professor of Anatomy and Cell Biology

Bulger, Ruth E., A.B., Ph.D.

(Vassar College, 1958; University of Washington, 1962)
Adjunct Professor of Anatomy and Cell Biology

Juliano, Sharon, B.A., O.T.R., Ph.D.

(Temple University, 1972; University of Pennsylvania,
1974, 1982)

Professor of Anatomy and Cell Biology

McCabe, Joseph T., B.A., M.S., Ph.D.

(Rutgers College, 1974; University of Wisconsin-Oshkosh, 1976; The City University of New York, 1983)

Associate Professor of Anatomy and Cell Biology

Porter, Linda L., B.S., Ph.D.

(McGill University, 1978; Boston University, 1985)

Associate Professor of Anatomy and Cell Biology

Rollag, Mark D., B.S. Ph.D.

(Colorado State University, 1971, 1977)

Professor of Anatomy and Cell Biology

Ruffolo, John J., B.S., Ph.D.

(Loyola University, Chicago, IL, 1966; University of Iowa, 1972)

Adjunct Associate Professor of Anatomy and Cell Biology

Sheridan, Michael, N., B.S., Ph.D.

(Stephen F. Austin State College, 1958;

Medical College of Virginia, 1963)

Professor of Anatomy and Cell Biology

Associate Dean for Graduate Education

Srivastava, Meera, Ph.D.

(Madras University, 1972, 1974; Indian Institute of Technology, New Delhi, India, 1981)

Associate Professor of Anatomy and Cell Biology

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Graduate Degree Program in Biochemistry and Molecular Biology

The program of Graduate Studies in Biochemistry and Molecular Biology is designed for doctoral candidates who plan to pursue a career in research and teaching. Design of individual programs will accommodate the educational goal of the candidate and meet all requirements set forth by the University and by the Department. Candidates for training programs leading to the M.S. degree will not be admitted. Creative research at the molecular level requires broad formal training and extensive laboratory experience. The program is suited for students with strong backgrounds in chemistry, biochemistry, and molecular and cell biology. Students are encouraged to participate in interdepartmental courses in molecular and cell biology. These provide for advanced training in topics of current interest and promote interaction with faculty and graduate students from other departments within the University.

Admission Requirements

In addition to the requirements for admission to graduate studies at USUHS, students preparing for graduate work in the Department of Biochemistry and Molecular Biology must have completed courses in organic chemistry, and mathematics through calculus. It is recommended that candidates should also have completed one year courses in physics, biology, molecular biology, biochemistry, physical chemistry or analytical chemistry, and have a reading knowledge of German, French or Latin. Candidates are advised to include in the application all available Scores from the special Graduate Record Examination Subject Tests in chemistry, biochemistry and molecular and cell biology.

Course Requirements

Within one year following matriculation, the student and his/her major advisor shall submit to the student's advisory committee a plan of courses to be taken in the degree program. The department requires that students meet the general requirements of the university. Of the required 48 credit hours of formal courses, 24 must be earned in courses approved by the Department, consisting of the required course in Medical Biochemistry (9 hrs), along with advanced courses offered outside and within the department, e.g., Cell Biology (9 hrs), Enzymology (4 hrs), Physical Biochemistry (4 hrs), Membrane Biochemistry (4 hrs), Techniques Used in Cellular and Molecular Biology (4 hrs), Genetics (4 hrs) and Bacterial Genetics (2 hrs).

Language Requirements

A reading knowledge of German, French or Latin or proficiency in computer science will be required for advancement to candidacy. This requirement may be satisfied by completion of a two semester sequence of college level courses in computer science or one of the above foreign languages with a passing grade, or by a passing score on the Educational Testing Service Foreign Language Proficiency Examination.

Qualifying Examination

To be eligible for advancement to candidacy for the Ph.D. degree, the student must pass Qualifying Examinations administered by a departmental

examination committee no later than two years after initiating a program of graduate study in the Department of Biochemistry. The Qualifying Examinations will be administered to the student upon successful completion of the required formal courses and fulfillment of the language requirement. The Qualifying Examinations in Biochemistry will consist of a comprehensive written examination and an oral defense of a proposed research project. The oral examination must be scheduled within one month of the comprehensive written examination. A week prior to the oral examination the student must submit to the examination committee a research proposal on a biochemical project which may be related to, but will not be his or her thesis project. The research proposal should include a review of the available literature, specific aims of the project, and descriptions of the methods and procedures to be used to accomplish the goals of the project. Satisfactory performances on both the written and the oral examinations will be required. Judgment concerning a satisfactory performance will be decided by a simple majority vote of the examination committee. At the discretion of the Departmental Graduate Affairs Committee, a student may be allowed to repeat each portion of the Qualifying Examination once.

Research Requirements

Within three months of passing the Qualifying Examinations, the student shall submit a prospectus of his or her dissertation research to the Departmental Graduate Affairs Committee for approval. Students are required to attend seminars within the department and to participate in the weekly MCB Journal Club. At regular intervals, students will be required to present seminars to the department based on the scientific literature and on their original research projects. After the completion of the dissertation projects, a written dissertation describing original experimental work and the conclusions drawn from the study shall be prepared and submitted to the thesis defense committee.

Teaching Requirements

Because experience in teaching is considered an integral part of the graduate program, all graduate students shall be required to participate in the teaching of Medical Biochemistry. Advanced graduate students will also be expected to participate in teaching the graduate courses offered by the department.

Faculty

Ishaiahu Shechter, B.Sc., Ph.D.

(Hebrew University, Jerusalem, 1964; University of California, 1969)
Professor and Chair of Biochemistry

Corcoran, Doris H., B.A., M. Phil., Ph.D.

(University of Connecticut, 1959; Yale University, 1968, 1969)
Associate Professor of Biochemistry

D'Arpa, Peter, Ph.D.

(George Washington University, 1984)
Assistant Professor in Biochemistry

Dey, Saibal, Ph.D.

(Wayne State University School of Medicine, 1994)
Assistant Professor of Biochemistry

Dunn, Teresa M., B.S., Ph.D.

(University of Main at Orono, 1978; Brandeis University, 1984)
Associate Professor of Biochemistry

Grahame, David A., B.S., Ph.D.

(Ohio State University, 1984)
Associate Professor of Biochemistry and Graduate Program Director

Haynes, Susan, Ph.D.

(Rockefeller University, 1982)
Assistant Professor of Biochemistry

Horowitz, David, Ph.D.

(Harvard University, 1986)
Assistant Professor of Biochemistry

Murdoch, Fern E., B.S., Ph.D.

(North Texas State University, 1987)
Assistant Professor of Biochemistry

Roseman, Mark A., B.S., Ph.D.

(University of Michigan, 1965; Michigan State University, 1971)
Associate Professor of Biochemistry

Terbush, Daniel, Ph.D.

(University of Michigan, 1991)
Assistant Professor of Biochemistry

Xiang, Xin, Ph.D.

(UMDNJ-Robert Wood Johnson Medical Center, 1991)
Assistant Professor of Biochemistry

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Graduate Degree Program in Emerging Infectious Diseases

The Graduate Program in Emerging Infectious Diseases (EID) is designed for applicants who wish to pursue a program of study leading to the Ph.D. degree in one of the academic tracks within the interdisciplinary field of Emerging Infectious Diseases. This Program has been created for students who are primarily interested in the pathogenesis, host response, and epidemiology of infectious diseases. Additionally, this program provides opportunities for physicians to complete the research components of their Fellowships in Infectious Diseases. This academic program will combine formal course work with research training that will be provided by an interdisciplinary EID faculty who hold primary appointments in the Departments of Microbiology and Immunology, Pathology, Preventive Medicine and Biometrics, Pediatrics, and Medicine. Graduate study in the EID Program is regulated both by the University rules and by additional requirements of the Program.

Admission Requirements

Applicants for the civilian Ph.D. program are accepted only as full-time students and must devote full-time effort to the Graduate Program in EID. All applicants must satisfy the University requirements for admission. Each applicant must complete a baccalaureate degree from an accredited academic institution before matriculation at USUHS. A strong undergraduate training in science is required, and undergraduate studies must have focused on an appropriate scientific discipline, e.g., biology, biochemistry, chemistry, microbiology, or physiology. Required courses include college level introductory and organic chemistry, biochemistry, physics, and mathematics. An introduction to molecular biology, molecular techniques, and genetics is highly recommended. Applicants must arrange for official transcripts of all prior college level courses and results of the Graduate Record Examination (taken within the last two years) to be sent to the Office of Graduate Education, USUHS. Students may elect to submit results of the Graduate Record Advanced Examination, in one or more of the subject areas listed above, in support of their application. Applicants must also arrange for three letters of recommendation from individuals who are familiar with the applicant's academic credentials to be sent to USUHS.

Students may be able to transfer into the EID program from other institutions. Academic credits from these institutions may be transferred to partially fulfill the EID requirements, with the approval of the EID Executive Committee and the USUHS Graduate Education Committee.

Advisors and Advisory Committees

The Initial Advisory Committee will provide guidance in the development of an academic program that consists of courses and laboratory rotations, monitor the student's academic progress, and serve as advocates for the student during his/her first year of graduate study. In cases of academic difficulty, the Initial Advisory Committee will meet with the EID Executive Committee to present the student's case and recommend corrective action or dismissal, if necessary.

At the end of first year of study, the student will select a Dissertation Advisor. Mutual agreement between the student and the EID

faculty member, as well as final approval by the Director of the EID program, is required. The Dissertation Advisor will provide guidance in selection of advanced courses, provide oversight and guidance on the selection of a thesis project, as well as its progress and completion.

Course Requirements

The student must successfully complete a minimum number of 48 course credit hours and a total number of 148 credit hours (core course requirements, electives and research credits). Students must maintain an average grade of 3.0 (B) or better throughout graduate training to remain in good academic standing in the Program. The required curriculum consists of the core courses and electives, training rotations in research laboratories, and completion of a research dissertation. Every student will also be required to attend an EID Journal Club and an EID Seminar Series. During the first year of study, each student will take 2 required laboratory rotations of approximately 12 weeks duration and an average of 15 hours per week.

Required Courses

All students are required to complete a series of core courses during the first year of training. Then the student will select one of three tracks in which to focus the remainder of his/her course work. The three tracks are: Microbiology and Immunology, Pathology, and Preventive Medicine and Biometrics. Each of these tracks will require specific courses. Core courses for Ph.D. students in all tracks of the EID Program are:

Year 1

Fall Quarter

Medical Microbiology and Infectious Diseases
Fundamentals of Infectious Disease Pathology and Laboratory
Diagnosis
Techniques in Cellular and Molecular Biology
EID Journal Club
EID Seminar

Winter Quarter

Fundamentals of Infectious Disease Pathology and Laboratory
Diagnosis
Models of Emerging Infectious Diseases I
Cell Biology I
Genetics
Lab Rotation

Spring Quarter

Models of Emerging Infectious Diseases II
Cell Biology II
Genetics
Lab Rotation

Year 2

Fall Quarter

Ethics and Responsible Conduct of Research

Winter Quarter

Models of Emerging Infectious Diseases III
Fundamentals of Epidemiology and Biostatistics

Spring Quarter

Models of Emerging Infectious Diseases IV

Qualifying Examination

Upon satisfactory completion of the formal, required course work, and not later than the end of the second year of graduate study, a Qualifying examination shall be taken by the student. An Examining Committee will be appointed by the Program Director for each student. The Qualifying Examination will consist of two sections: written and oral. The first section will be an extensive written examination in which the student will be expected to write detailed answers to essay questions prepared by the Examining Committee. Passing the written examination is a prerequisite for taking the oral exam. The second half of the Qualifying Examination will be an oral exam to be administered by the Examining Committee. A grade of pass or fail will be assigned for the oral exam based on a simple majority. A passing grade on both parts of the examination is required for successful completion of this requirement. Each section of the exam may be retaken once.

Advancement to Candidacy

Civilian candidates for the Ph.D. degree in EID must complete all requirements for advancement to candidacy no later than two years after initiation of his/her program of study. Requirements for advancement to candidacy include completion of 48 quarter credit hours of formal course work, a cumulative GPA of 3.0 or above, completion of laboratory rotations, and successful completion of the Qualifying Examination.

Dissertation Research Requirements

Original experimental work is an essential part of graduate training. After a student has advanced to candidacy, he/she will present a Departmental seminar annually based on his/her original research project. In addition, the student will meet with his/her Advisory Committee semi-annually to assess and ensure progress towards completion of the research project. Summaries of those meetings will become part of the student's academic file. A written dissertation, based on the student's original experimental work, shall be prepared by the student under supervision of the student's major faculty advisor and with the concurrence of the student's Advisory Committee.

Dissertation Defense

A Dissertation Examination Committee that consists of the student's Advisory Committee will read the dissertation to certify the document's acceptability by the criteria of scope and quality. This Committee will also conduct the dissertation defense examination. The defense of the dissertation will consist of a public seminar and will be followed by an oral examination that is closed to the public. If either the dissertation or the oral defense is deemed unsatisfactory, the Dissertation Examination Committee shall formulate recommendations for appropriate remedial action which may include, but are not limited to: 1) revision of the dissertation; 2) revision of the dissertation only after performance of specified additional research; or 3) repetition of the oral defense after a specified interval of time. An unsatisfactory performance on the repetition of a dissertation defense will result in the discharge of a student from the Ph.D. program.

Faculty

Faculty appointments for the EID Graduate Program are currently being established.

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Graduate Degree Program in Medical and Clinical Psychology

The Department of Medical and Clinical Psychology offers training in research and clinical psychology. Applicants wishing to obtain only a Master's degree will ordinarily not be admitted.

The Ph.D. program in Medical Psychology is designed for students with a background in psychology, biology, or life sciences who wish to pursue research in a field that combines experimental, social, or environmental psychology with the biomedical sciences. The Ph.D. program in Clinical Psychology is designed for students with a background in psychology who wish to pursue clinical practice in military settings.

The underlying assumption of medical psychology is that behavioral factors play an important role in the etiology, prevention and treatment of physical and mental illnesses. The graduate program will therefore equip the student to approach problems with an integration of behavioral and biomedical expertise. Emphasis in both the Medical and Clinical Psychology programs will be on the application of psychological theories and methods to a variety of physical and mental health problems, including those of: stress; behavioral factors in cardiovascular disease; addictive and appetitive behaviors; psychopharmacology; stress and eating; obesity; anxiety disorders; stress and substance abuse; gender differences in behaviors and health; effects of noise on performance; behavioral genetics; occupational health; pain; work disability; and behavioral toxicology of anti-HIV drugs.

Applicants to the Medical and Clinical Psychology programs must meet all University standards for admission. Applicants for the Clinical program additionally satisfy requirements for military service and demonstrate suitability for clinical practice. Supplementary application materials should be requested by clinical applicants.

Admission Requirements

In addition to the standard University Graduate Education application form, the Department of Medical and Clinical Psychology requires complete academic transcripts of post-secondary education; the Graduate Record Examination (advanced test not required); three letters of reference from individuals familiar with the academic work or scientific achievement, personal essay expressing career objectives; and, where applicable, specification of record of military service.

Applicants are expected to have satisfactorily completed course work in statistics and experimental psychology. Course work in biology and chemistry is strongly recommended. Applicants should also have had course work in several content areas of psychology, and some research experience in psychobiology or experimental, clinical, personality, social, or environmental psychology. Students are accepted with the understanding that they are full-time students and will devote their full efforts to the graduate study program. They cannot be enrolled concurrently in any other program or institution and will not normally be given leaves of absence, other than ordinary vacation time or sick leave.

Note: All applications to the Medical Psychology program (including G.R.E. scores (general test only), transcripts, and three letters of recommendation) must be received by 15 March for consideration to the program for the following Fall. All applications to the Clinical

Psychology program—and all active duty applicants to either program—must be received by 15 January for consideration to the program for the following Fall. The extra time required for the Clinical Psychology program is needed for the military selection process, and where appropriate, the commissioning of civilians selected.

Course Requirements

The student and major advisor shall (within one year following matriculation in the department) submit to the student's advisory committee a plan of courses to be taken in a degree program. The department requires that students in the medical psychology program ordinarily meet general requirements in the following areas: Medical Psychology, Statistics, Research Methods, Medical Physiology, and Pharmacology. These requirements are ordinarily satisfied by successful completion of the medical school course offerings or departmental offerings in these subjects. Students in the Clinical Psychology program must additionally satisfy formal accreditation and training requirements in preparation for their future roles as "Scientist/Practitioners". These courses include specific clinical content courses, practica and clerkships, and courses related to military psychology and public health.

Qualifying Examination

A preliminary (qualifying) examination in psychology and related areas shall be administered to each student by the student's advisory committee upon successful completion of required courses and within two years of admission to the program.

The exact format of the qualifying examination will be determined by the faculty to meet the needs of individual students. Satisfactory performance on the qualifying examination is a partial requirement for continued participation in the Ph.D. program. Additional requirements include successful completion of all course work and approval of the departmental Graduate Affairs Committee for Advancement to Candidacy.

Evaluation of Student Progress

Such review will encompass course work and achievements in research and clinical settings, as appropriate.

Research Requirements

All students are expected to complete an independent research study by the end of their second year. Upon concurrence of the student's advisor and one other department faculty member, the research will be submitted to the USUHS Graduate Education Office (GEO) as a Master of Science thesis. Additionally, all students must complete a formal Doctoral Dissertation before being awarded a Ph.D.

Course Schedule

Typical course schedules for the Medical and Clinical Psychology tracts during the first year:

Medical Psychology

Fall Quarter

Research Methods & Complex
Human Experimentation I
Experimental Statistics
Psychology of Learning or
Cognitive Psychology
(offered alternate Fall quarters)
History & Systems

Clinical Psychology

Fall Quarter

Research Methods & Complex
Human Experimentation I
Experimental Statistics
Psychology of Learning or
Cognitive Psychology
(offered alternate Fall quarters)
History & Systems

(offered alternate Fall quarters)
Medical & Clinical
Psychology Seminar
Research

(offered alternate Fall quarters)
Adult Psychopathology
Medical & Clinical Psychology
Seminar
Research

Winter Quarter
Research Methods & Complex
Human Experimentation II
Applied Multiple Regression
Analysis in Psychology
Medical Physiology
Introduction to Medical Psychology
Medical & Clinical Psychology
Seminar
Medical Psychology Seminar
Research

Winter Quarter
Research Methods & Psychometrics
Experimentation II
Applied Multiple Regression
Analysis in Psychology
Physiological Basis of Behavior
Introduction to Medical Psychology
Ethics in Psychology
Systematic Observation &
Interviewing
Medical & Clinical Psychology
Seminar
Medical Psychology Seminar
Research

Spring Quarter
Introduction to Medical Psychology
Medical Physiology
Medical & Clinical Psychology
Seminar
Medical Psychology Seminar
Research

Spring Quarter
Introduction to Medical Psychology
Physiological Basis of Behavior
Clinical Assessment II
Human Development
Medical & Clinical Psychology Seminar
Medical Psychology Seminar
Research

Summer Quarter
Research

Summer Quarter
Clerkship I
Research Paper

After the first year, students in both programs will continue with required course work, research, clinical training (where appropriate), qualifying examinations, as well as thesis and dissertation preparation.

Major Advisor and Advisory Committee

At the time of admission, the student shall be assigned a temporary advisor, a faculty member who has an appointment in the Department of Medical and Clinical Psychology. During the first year of graduate study, the student will attend classes and rotate among different faculty members' research groups, participating in research work and discussion. This procedure is designed to facilitate the selection of a thesis research topic and a faculty mentor. Shortly before the end of the first year, the student will submit to the departmental Graduate Affairs Committee a list of his or her preferences as to a permanent major advisor. The committee will assign students to faculty advisors in a mutually satisfactory manner.

The major advisor will direct the student's academic work and thesis research program and provide advice during preparation of the dissertation, with the counsel of other members of an advisory committee. Along with directing the student's program of study, research, and thesis preparation, the committee shall be responsible for evaluation the student's progress and readiness to take the final examination. The committee will meet at least once yearly to review the student's progress.

Faculty

FULL-TIME APPOINTMENTS

Krantz, David S., B.S., Ph.D.

(City College of New York, 1971; University of Texas,

Austin, 1975)
Professor and Chair of Medical and Clinical Psychology
Director of Graduate Studies, Medical and Clinical
Psychology

Feuerstein, Michael, A.B., M.S., Ph.D.
(Boston University, 1972; University of Georgia, 1975, 1977)
Professor of Medical and Clinical Psychology,
Preventive Medicine and Biometrics
Director of Clinical Ph.D. Training Program,

Gabbay, Frances H., B.A., Ph.D.
(Indiana University, 1974, 1983)
Research Assistant Professor of Medical and Clinical Psychology

Grunberg, Neil E., B.S., M.S., Ph.D.
(Stanford University 1975; Columbia University, 1977, 1980)
Professor of Medical and Clinical Psychology
Professor of Neuroscience

Kop, Willem J., B.A., M.A., M.Sc., Ph.D.
(University of Utrecht, 1984, 1988; University of Limburg,
1993, 1994)
Research Assistant Professor of Medical and Clinical Psychology

Sbrocco, Tracy, B.S., Ph.D.
(University of Akron, 1983; Vanderbilt University, 1993)
Assistant Professor of Medical and Clinical Psychology

Schmidt, Norman B., A.B., M.A., Ph.D.
(The University of Chicago, 1986; University of Texas, Austin, 1988,
1991)
Assistant Professor of Medical and Clinical

Singer, Jerome E., B.A., Ph.D.
(University of Michigan, 1957; University of Minnesota, 1961)
Professor Emeritus of Medical and Clinical Psychology

SECONDARY APPOINTMENTS

Ader, Deborah N., B.A., M.A., Ph.D.
(Tufts University, 1979; University of Colorado, 1985, 1988)
Assistant Professor of Psychiatry and Assistant Professor of Medical
and Clinical Psychology (Secondary)

Davis, Hirsch, B.A., M.A.
(The College of Wooster, 1977; University of Illinois, 1983)
Instructor of Medical and Clinical Psychology

Law, Wendy A., B.A., M.A., Ph.D.
(Wells College, 1976; University of New Mexico, 1983, 1989)
Assistant Professor of Medical and Clinical Psychology

Stiers, Michael J., B.A., M.A., Ph.D.
(City College of New York, 1970; The American University,
1974, 1976)
Clinical Assistant Professor of Medical and Clinical Psychology

Tatham, Thomas A., B.A., Ph.D.
(Temple University, 1982, 1987)
Assistant Professor of Psychiatry and Medical and Clinical Psychology

(Secondary)

Waechter, Donna M., B.A., Ph.D.

(Dickinson College, 1976; Texas Tech University, 1983)

Assistant Dean, Medical Education and Assistant Professor of Medical and Clinical Psychology (Secondary)

ADJUNCT APPOINTMENTS

Baum, Andrew S., B.S., Ph.D.

(University of Pittsburg, 1970; State University of New York, 1974)

Adjunct Professor of Medical and Clinical Psychology

CLINICAL APPOINTMENTS

ARMY

Crow, Bruce E., MAJ, MS, USA, B.S., Ph.D.

(University of Illinois, 1977; Nova University, 1986)

Clinical Assistant Professor of Medical and Clinical Psychology

Johnson, Patti L., MAJ, MS, USA, B.S., M.A., Ph.D.

(University of Illinois, 1981; State University of New York, 1984, 1986)

Clinical Assistant Professor of Medical and Clinical Psychology

Klusman, Lawrence E., LTC, MS, USA, B.S., Ph.D.

(Georgetown University, 1970; The Catholic University of America, 1976)

Clinical Assistant Professor of Medical and Clinical Psychology

Kowal, Dennis M., COL, MS, USA, B.A., M.A., Ph.D.

(University of California, 1965; San Jose State University, 1968; Claremont Graduate School & University Center, 1970)

Clinical Assistant Professor of Medical and Clinical Psychology

Laskow, Gregory B., B.S., M.S., Ph.D.

(University of Scranton, 1969, 1971; Texas Tech University, 1974)

Clinical Assistant Professor of Medical and Clinical Psychology

Spector, Jack, COL, MS, USA, (Retired), B.A., M.A., Ph.D.

(Temple University, 1978; University of Louisville, 1981, 1984)

Clinical Assistant Professor of Medical and Clinical Psychology

Tamayo, Federico M.V., LTC, MS, USA, B.A., M.S., Ph.D.

(University of Santa Clara, 1971; Washington State University, 1973, 1975)

Clinical Assistant Professor of Medical and Clinical Psychology

NAVY

Getka, Erik J., CDR, MSC, USN, B.A., M.A., Ph.D.

(Loyola College, 1978; The Catholic University of America, 1980, 1987)

Clinical Assistant Professor of Medical and Clinical Psychology

Glogower, Frederic D., CPT, MSC, USN, B.S., M.A., Ph.D.

(University of Pittsburgh, 1970; West Virginia University, 1974, 1977)

Clinical Assistant Professor of Medical and Clinical Psychology

McCullah, Robert D. CPT, MSC, USN. (Retired), B.A., M.A., Ph.D.

(University of Maryland, 1963; George Washington University, 1965; University of Maryland, 1969)

Clinical Assistant Professor of Medical and Clinical Psychology

Moquin, Barbara E., R.N., MSN, USN, B.S.N, M.S.N.

(Georgetown University, 1978; The Catholic University of America, 1981)
Clinical Instructor of Medical and Clinical Psychology

Mullins, Frank A., Jr., CPT, MSC, USN, B.S., M.A., Ph.D.

(University of Southern Mississippi, 1958, 1960, 1971)
Clinical Assistant Professor of Medical and Clinical Psychology

Podd, Marvin H., CPT, MSC, USN(Retired), B.A., Ph.D.

(Rutgers University, 1965; State University of New York, 1970)
Clinical Assistant Professor of Medical and Clinical Psychology

AIR FORCE

Cayton, Tommie G., Lt Col, BSC, USAF, B.A., M.S., Ph.D.

(Brown University, 1970; Florida State University, 1972, 1974)
Clinical Assistant Professor of Medical and Clinical Psychology

Chapman, Ronald K., Lt Col, BSC, USAF, B.S., Ph.D.

(Brigham Young University, 1975, 1983)
Clinical Assistant Professor of Medical and Clinical Psychology

Gerner, Margaret A., Capt, BSC, USAF, B.A., M.A., Ph.D.

(University of Missouri, 1983, 1986, 1989)
Clinical Assistant Professor of Medical and Clinical Psychology

Mulligan, Kevin P., Maj, BSC, USAF, B.A., M.A., Psy.D.

(Providence College; South Connecticut State University;
University of Denver, 1986)
Clinical Assistant Professor of Medical and Clinical Psychology

Poston, Walker S.C., Capt, BSC, USAF, B.A., Ph.D.

(University of California-Davis, 1983; University of California-Santa
Barbara, 1990)
Clinical Assistant Professor of Medical and Clinical Psychology

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Graduate Degree Program in Medical History

The Department of Medical History offers a Master of Military Medical History degree. The degree is now limited to serving officers of the United States Army. It is designed to meet the professional needs of the Army officers in the operationally oriented occupational specialties of the Medical Service Corps, with preference for the MOS 70H. The program will prepare the officer to be an instructor in professional military medical education programs in the Army Medical Department and in Army school systems and for utilization as a field historian for specific military medical issues. Graduates will qualify for the skill designator 5X awarded by the United States Army Center of Military History which is used by the Army to identify all commissioned military historians.

Admission Requirements

Applicants must be selected for long term civilian education by the Surgeon General of the Army and must be acceptable for follow-on assignment to the U.S. Army Academy of the Health Sciences as an instructor. The USUHS Graduate Education Office retains admission authority. The Aptitude portion of the Graduate Record Examination is required. All academic transcripts, a copy of the Officer's Record Brief, copies of all efficiency reports and three letters of recommendation are required. The applicant must be a graduate of the AMEDD Officer's Advanced Course and graduation from the Combined Army and Services Staff School is preferable. The program is restricted to one student per year.

Program Outline

The program will teach research methods and analysis, provide a specific knowledge base, and document that the graduate is capable of using the methods to extend the knowledge base. The twelve month program includes:

1. Completion of the Army's two week military history teacher program at The Combat Studies Institute, USA Command and General Staff College, Ft. Leavenworth, Kansas.
2. Completion of a program of study at the Uniformed Service University to include a minimum of 48 quarter hours of graduate credit. This will include an overview of United States history, military history and medical history, with particular emphasis on the history of military medicine, as well as on methods of historical research and teaching. The core courses require intensive reading and tutorial work, attendance at local seminars and national meetings, and the independent preparation of lectures and seminars. At least two graduate history seminars will be taken at the Department of History, The American University, Washington, DC.
3. Presentation of original research in an area of U.S. military medical history in such a way as to establish the student's capacity to function as a military medical history instructor and field military medical historian.

Faculty

Core faculty for the program are Dale C. Smith, Ph.D., Professor of Medical History and Kim Pelis, Ph.D., Assistant Professor of Medical History. Associated faculty includes Robert J.T. Joy, M.D., Professor Emeritus of Medical History, John Parascondola, Ph.D., Chief Historian, U.S. Public Health Service, and Clark Swain, M.D., Veteran's

Administration Medical Service. Adjunct faculty will be utilized for special topics.

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Graduate Degree Program in Microbiology and Immunology

The Department of Microbiology and Immunology offers a Graduate Program leading to the Ph.D. degree. This Program is designed for full-time students who wish to pursue professional research and academic careers in the various disciplines encompassed within Microbiology and Immunology. A broadly based program of formal training is combined with an intensive laboratory research experience. Research training emphasizes modern methods in molecular biology, cell biology, as well as interdisciplinary approaches. A wide range of interests is represented in the Department, including both basic and medical aspects of Bacteriology, Genetics, Virology, Immunology, Parasitology, Infectious Diseases, and Pathogenic Mechanisms.

Admission Requirements

Both civilians and military personnel are eligible to apply for admission into the Ph.D. program. Applicants are accepted only as full-time students into the Ph.D. program. No M.S. degree program is offered. Prior to acceptance, each applicant must complete a baccalaureate degree that includes college-level courses in mathematics, biology, physics, and chemistry (inorganic and organic). Advanced level courses in biochemistry, microbiology, molecular biology, genetics, and cell biology are very strongly recommended. Active-duty military applicants must obtain the approval and sponsorship of their parent military service, in addition to acceptance into the Departmental Graduate Program.

Each applicant must submit a USUHS graduate training application form (available from our web site: <http://www.usuhs.mil/mic/index.html>), complete academic transcripts of post-secondary education, and results of the Graduate Record Examination (one advanced examination is also recommended). In addition, three letters of recommendation from individuals familiar with the academic achievements and/or research experience of the applicant and a personal statement which expresses the applicant's career objectives are required. The Department of Microbiology and Immunology will consider exemptions from individual requirements on a case by case basis.

Major Advisor and Advisory Committee

For the first year of graduate study, the student's academic plan will be guided by a Temporary Advisory Committee that is appointed by the Chairman of the Department. During this year, the student will attend classes and will also rotate through two or more laboratories during which s/he will participate in ongoing laboratory projects and discussions. This approach to the first year of graduate study is designed to facilitate the selection of a discipline within the field of Microbiology and Immunology for thesis research, as well as a major faculty advisor. Subsequently, the Graduate Program Director, in consultation with the student and the major advisor, will appoint a permanent Advisory Committee. This Advisory Committee shall be responsible for supervision of the student's program of study and for evaluation of the student's progress. Moreover, this Committee is responsible for the assessment of the student's readiness to write a dissertation and to take the final examination in defense of the dissertation.

Course Requirements and Laboratory Rotations

Course Requirements. The curriculum is divided into required Core Courses and Approved Electives that are graded, as well as required non-graded courses. A total of 48 credit hours in formal courses that issue letter grades is required, and a total of 148 credit hours is required for the Ph.D. degree. Students must maintain an average grade of 3.0 (B) or better throughout the first two years to remain in good academic standing in the Graduate Program.

Core Courses that define the mandatory component of formal courses leading to the Ph.D. degree will consist of successful completion of the following courses.

Year 1

Fall Quarter

Medical Microbiology and Infectious Diseases
Techniques in Cellular and Molecular Biology
Biochemistry

Winter Quarter

Medical Microbiology and Infectious Diseases
Cellular and Molecular Immunology*
Biochemistry

Spring Quarter

Genetics
Prokaryotic and Eukaryotic Cell Biology and Genetics*
Biochemistry

Year 2

Fall Quarter

None

Winter Quarter

Virology*

Spring Quarter

Pathogenic Mechanisms*

*Offered on alternate years

Other graded courses may complete the required 48 hours. All students must demonstrate a satisfactory level of computer literacy. This goal can be achieved by successful completion of the formal course entitled Introduction to Computers. This course is generally taken during the Fall Quarter of the first year. Approved Electives include other courses offered within the University or through the Foundation for Advanced Education in the Sciences (FAES) at the National Institutes of Health and must be approved by the student's Temporary Advisory Committee. Suggested Approved Electives include Cell Biology I/II and a Biostatistics course.

Students must also take a course entitled Ethics and Responsible Conduct of Research that is generally offered during one Quarter of the first year. Students must also enroll in the Departmental Seminar Series called Frontiers in Microbiology, Topics in Microbiology, and Tutorial in Microbiology (Laboratory Rotations). Credit is given for all of these required courses, but no grades are given. Credits for graduate courses taken at other institutions may be transferred with the approval of the student's Temporary Advisory Committee. The maximum number of quarter credit hours transferable is 24. Exemptions from USUHS courses will be considered on an individual basis.

Failure to achieve a B average by the end of the second year of course work will result in dismissal from the Graduate Program. Recommendations to discharge students from the Graduate Program for other academic reasons require approval by a two-thirds vote of the Department faculty and by the Department Chairman.

Laboratory Rotations. During the first year of study, each student is required to take two laboratory rotations of approximately 12 weeks duration and an average of 15 hours per week. These rotations must be taken in research laboratories on the USUHS campus and are selected by the student in consultation with his/her Temporary Advisory Committee. The student will receive 2 pass/fail credits for each rotation. At the end of each laboratory rotation, the faculty member will evaluate the student's performance by completion of an evaluation form designed to help the student optimize his/her laboratory techniques and interactions.

Teaching Requirements

The Department of Microbiology and Immunology considers teaching experience to be an integral part of graduate education. Therefore, all graduate students who have faculty advisors within the Department of Microbiology and Immunology, regardless of Graduate Program affiliation, are required to participate in the teaching of the Medical Microbiology and Infectious Diseases course during their second and third year of enrollment, at a minimum. This requirement applies whether or not the student receives a stipend from USUHS. All students may be required to assist in the teaching activities of the Department in succeeding years, as requested.

Qualifying Examination

Upon satisfactory completion of the formal, required course work, and not later than the end of the second year of graduate study, a comprehensive Qualifying Examination in Microbiology and Immunology shall be taken by the student. The Graduate Program Director shall oversee the preparation of the written portion of the Examination and appoint the Oral Examination Committee.

The Qualifying Examination will consist of two parts, a written examination and an oral examination. The written examination will be comprehensive and will consist of questions in Bacterial Physiology and Genetics, Immunology, Pathogenic Mechanisms, Virology, and Parasitology. Passing the written examination is a prerequisite for taking the oral examination. The oral examination will also be comprehensive, but may emphasize areas of possible weakness identified by the written examination. A grade of pass or fail will be assigned for the oral examination based on a simple majority vote of the Oral Examination Committee. A passing grade on both parts of the examination is required for successful completion of this requirement. Students who fail either the written or oral examination may re-take that section of the Examination one time only, within 6 months of the initial examination. Failure to pass the re-examination of either the written or oral sections of the Exam will result in a recommendation for dismissal from the Graduate Program to the Chairman.

Advancement to Candidacy

Candidates for the Ph.D. degree in Microbiology and Immunology must complete all requirements for advancement to candidacy no later than two years after initiation of his/her program of graduate study at USUHS. Exceptions may be granted only on the recommendation of the student's Advisory Committee and with the approval of the Departmental Chairman and the USUHS Graduate Education Committee. Requirements for

advancement to candidacy include: 1) completion of the minimal requirement of 48 quarter credit hours of formal graduate level course work; 2) satisfactory completion of all required courses; a cumulative G.P.A. of 3.0 or above; 3) satisfactory completion of laboratory rotations; 4) a demonstration of a satisfactory level of computer literacy; and 5) successful completion of the Qualifying Examination.

Dissertation Research Requirements

Original experimental work is an essential part of graduate training. After a student has advanced to candidacy, s/he will present a Departmental seminar annually, based on his/her original research project. In addition, the student will meet with his/her Advisory Committee semi-annually to assess and ensure progress towards completion of the research project. Summaries of those meetings will become part of the student's academic file. A written dissertation, based on the student's original experimental work, shall be prepared by the student under supervision of the student's major faculty advisor and with the concurrence of the student's Advisory Committee.

Dissertation Defense

A Dissertation Examination Committee that consists of the student's Advisory Committee will read the dissertation in order to certify the document's acceptability by the criteria of scope and quality. This Committee will also conduct the dissertation defense examination. The defense of the dissertation will consist of a public seminar and will be followed by an oral examination that is closed to the public. If either the dissertation or the oral defense is deemed unsatisfactory, the Dissertation Examination Committee shall formulate recommendations for appropriate remedial action which may include, but are not limited to: 1) revision of the dissertation; 2) revision of the dissertation only after performance of specified additional research; or 3) repetition of the oral defense after a specified interval of time. An unsatisfactory performance on the repetition of a dissertation defense will result in the discharge of a student from the Ph.D. program.

Faculty

O'Brien, Alison D. O'Brien, A.B., Ph.D.

(University of California at Davis, 1969; Ph.D., Ohio State, 1976)
Professor and Chair of Microbiology and Immunology

Metcalf, Eleanor S., A.B., M.S., Ph.D.

(Ohio Wesleyan, 1965; University of Michigan, 1966; University of Pennsylvania, 1976)
Professor of Microbiology and Immunology and Graduate Program Director

Broder, Christopher C., B.S., M.S., Ph.D.

(Florida Institute of Technology, 1983, 1985; University of Florida, 1989)
Assistant Professor of Microbiology and Immunology

Gause, William C., A.B., Ph.D.

(University of Virginia, 1980; Cornell University, 1986)
Professor of Microbiology and Immunology

Giam, Chou-Zen, B.S., Ph.D.

(National Taiwan University, 1975; University of Connecticut - Farmington, 1983)
Professor of Microbiology and Immunology

Grieder, Franziska B., D.V.M., Ph.D.

(University of Zurich, 1984; University of Wisconsin at Madison, 1989)

Assistant Professor Microbiology and Immunology

Jerse, Ann E., A.B., Ph.D.

(Indiana State University, 1980; University of Maryland, 1991)

Assistant Professor of Microbiology and Immunology

Ji, Guangyong, B.Sc., Ph.D.

(Shandong University, P.R. China, 1983; University of Illinois-Chicago, 1992)

Assistant Professor of Microbiology and Immunology

Langreth, Susan G., A.B., Ph.D.

(Wellesley College, 1962; University of Chicago, 1969)

Associate Professor of Microbiology and Immunology

Maurelli, Anthony T., B.S., Ph.D.

(Villanova University, 1974; University of Alabama at Birmingham, 1983)

Professor of Microbiology and Immunology

Rick, Paul D., A.B., M.S., Ph.D.

(Macalester College, 1964; University of Minnesota, 1966, 1971)

Professor and Vice Chair of Microbiology and Immunology

Vogel, Stefanie N., B.S., Ph.D.

(University of Maryland, 1972, 1977)

Professor of Microbiology and Immunology

10

Graduate Degree Program in Molecular and Cell Biology

Modern biology has been revolutionized by developments in molecular and cellular biology. The developments cross traditional disciplines in such a way that they touch virtually every aspect of biomedical investigation. In recognition of this fact, the Uniformed Services University of the Health Sciences, F. Edward Hebert School of Medicine has established a new interdisciplinary graduate program in Molecular and Cell Biology within the Graduate Education Program. The faculty are full-time members of the Departments of Anatomy and Cell Biology, Biochemistry, Microbiology and Immunology, Pathology, Pharmacology, Physiology, and in a few instances, other departments at the University who share an interest in cell structure and function at the molecular and cellular level.

The Program provides an opportunity for students to pursue classroom and laboratory study leading to the degree of Doctor of Philosophy in Molecular and Cell Biology. In addition, the Molecular and Cell Biology Program serves as an opportunity for facilitating educational and scientific interactions between both graduate and medical students and faculty at USUHS that share a common interest and contemporary approach to the study of cellular processes.

Program of Study

The program of study is divided into two portions; course work in both fundamental and advanced areas of molecular and cellular biology, and research toward the doctor of philosophy degree. The first year will consist of courses in biochemistry, cell biology, immunology, bacterial and eucaryotic genetics, recombinant DNA techniques and microcomputers. The second year curriculum offers advanced courses in a wide variety of disciplines, including virology, biochemistry, immunology, molecular endocrinology and cell biology. Throughout graduate study students will participate with selected faculty in a journal club designed to foster interaction across disciplines and develop skills required for data presentation and analysis. There will also be a biweekly Molecular and Cell Biology Seminar Series that brings renowned scientists to the University. Students may also take advantage of seminars offered by the individual departments, the Interdepartmental Neuroscience Program, and at the National Institutes of Health. Students will participate in research rotations in 3 laboratories of their choice during the first year. From these rotations the students will choose a mentor for their doctoral research. The mentor will guide the student throughout completion of a research project and dissertation leading to the degree of doctor of philosophy.

Faculty

Gause, William, B.A., Ph.D.

(University of Virginia, 1980; Cornell University, 1986)
Director, Molecular and Cell Biology; Professor of Microbiology & Immunology

Adelman, Mark R., A.B., Ph.D.

(Princeton University, 1963, University of Chicago, 1969)
Associate Professor of Anatomy and Cell Biology

Armstrong, Regina C., B.S., Ph.D.

(University of Rochester, 1982; University of North Carolina, 1987)
Associate Professor of Anatomy and Cell Biology

Broder, Christopher, Ph.D.

(University of Florida, 1989)
Assistant Professor of Microbiology and Immunology

Bünger, Rolf, M.D., Ph.D.

(University of Frieberg, 1964; University of Heidelberg, 1970)
Professor of Physiology

Byrd, Linda, Ph.D.

(University of Maryland, 1992)
Adjunct Assistant Professor of Microbiology and Immunology

Chung, Su Yun, B.S., M.S., Ph.D.

(National Taiwan University, 1965; Illinois Institute of Technology, 1968;
University of Chicago, 1974)
Associate Professor of Biochemistry

Cox, George, Ph.D.

(Ohio State University, 1987)
Assistant Professor of Pharmacology

Cutler, Mary Lou, Ph.D.

(Hahnemann, 1980)
Assistant Professor of Pathology

D'Arpa, Peter, Ph.D.

(George Washington University, 1986)
Assistant Professor of Biochemistry

Dunn, Teresa, B.S., Ph.D.

(University of Maine at Orono, 1978; Brandeis University, 1984)
Associate Professor of Biochemistry

Dveksler, Gabriela, Ph.D.

(USUHS, 1991)
Associate Professor of Pathology

Giam, Chou Zen, Ph.D.

(University of Connecticut (Farrington), 1983)
Associate Professor of Microbiology and Immunology

Grahame, David, Ph.D.

(Ohio State University, 1984)
Associate Professor of Biochemistry

Grieder, Franziska, D.V.M., Ph.D.

(University of Zurich-Switzerland, 1985; University of Wisconsin-Madison,
1989)
Assistant Professor of Microbiology and Immunology

Grimley, Philip, B.S., M.D.

(The City College of New York, 1956; Albany Medical College, 1961)
Professor of Pathology

Harmon, Jeffrey, B.S., M.S., Ph.D.

(The Cooper Union for the Advancement of Science & Art, 1971; University

of Rochester, 1974, 1976)
Professor of Pharmacology

Jerse, Ann, Ph.D.
(University of Maryland at Baltimore, 1991)
Assistant Professor of Microbiology

Ji, Guangyong, Ph.D.
(University of Illinois, Chicago, 1992)
Assistant Professor of Microbiology and Immunology

June, Carl, M.D.
(Baylor College of Medicine, 1979)
Professor of Medicine

Lipkowitz, Stanley, Ph.D., M.D.
(Cornell University, 1983, 1984)
Associate Professor of Medicine

Maheshwari, Radha, Ph.D.
(Kanpur University, 1974)
Professor of Pathology

Maurelli, Anthony, B.S., Ph.D.
(Villanova University, 1974; University of Alabama at Birmingham, 1983)
Associate Professor of Microbiology and Immunology

McCabe, Joseph, Ph.D.
(City University of New York, 1983)
Professor of Anatomy and Cell Biology

Metcalf, Eleanor, A.B., M.S., Ph. D.
(Ohio Wesleyan University, 1965; University of Michigan, 1966; University of Pennsylvania, 1976)
Professor of Microbiology and Immunology

Minton, Kenneth, M.D.
(University of California, Los Angeles, 1972; Stanford University, 1977)
Professor of Pathology

Murdoch, Fern, Ph.D.
(North Texas State University, 1987)
Assistant Professor of Biochemistry

O'Brien, Alison, Ph.D.
(University of California at Davis, 1968; Ohio State University, 1976)
Professor and Chair Microbiology and Immunology

Pollard, Harvey, M.D., Ph.D.
(University of Chicago, 1969, 1973)
Professor and Chair of Anatomy & Cell Biology

Quinnan, Gerald, CAPT, MC, USN
(St. Louis University, 1973)
Professor of Preventive Medicine

Rick, Paul, Ph.D.
(Macalester College, 1964; University of Minnesota, 1971)
Professor of Microbiology And Immunology

Rui, Hallgeir, M.D., Ph.D.
(Oslo, Norway, 1988)
Assistant Professor of Pathology

Sei, Yoshitatsu, M.D., Ph.D.
(Kurume University, Japan, 1983, 1988)
Research Assistant Professor of Anesthesiology

Shechter, Ishaiahu, Ph.D.
(UCLA, 1969)
Professor and Chair of Biochemistry

Snapper, Clifford, M.D.
(Albany College, 1981)
Professor of Pathology

Symes, Aviva, Ph.D.
(University College of London, 1990)
Assistant Professor of Pharmacology

Szallasi, Zoltan, M.D.
(University Medical School, Debrecen, Hungary, 1988)
Assistant Professor of Pharmacology

Terbush, Daniel, Ph.D.
(University of Michigan, 1991)
Assistant Professor of Biochemistry

Tsokos, George, M.D., Ph.D.
(University of Athens, 1975, 1977)
Professor of Medicine

Vogel, Stefanie, Ph.D.
(University of Maryland, 1972, 1977)
Professor of Microbiology & Immunology

Williams, Robert W. ,Ph.D.
(Washington State University, 1980)
Associate Professor of Biochemistry

Graduate Degree Program in Neuroscience

The Graduate Program in Neuroscience is designed for candidates for the Ph.D. degree in Neuroscience. This is an interdisciplinary program with courses and research training provided by the Neuroscience Faculty who hold primary appointments in the Departments of Anatomy and Cell Biology, Anesthesiology, Biochemistry, Medical Psychology, Microbiology and Immunology, Neurology, Pathology, Pediatrics, Pharmacology, Physiology, and Psychiatry at USUHS. The interdisciplinary nature of the program permits considerable flexibility in the choice of courses and research areas; training programs are tailored to meet the individual requirements of each student.

The Program is designed for students with a strong undergraduate training in the physical sciences, biology, or psychology who wish to pursue a professional career in neuroscience research. Integrated instruction in the development, structure, function and pathology of the nervous system and its interaction with the environment is provided. Graduate study in the Neuroscience Program is regulated both by the University rules and by additional requirements of the Program.

Admission Requirements

Applicants are accepted only as full-time students and must devote full-time effort to the Graduate Program in Neuroscience. All applicants must satisfy the University requirements for admission. Each applicant must complete a baccalaureate degree from an accredited academic institution before matriculation at USUHS. We recognize that neuroscience students come from a wide variety of backgrounds. A strong undergraduate training in science with completion of courses in biochemistry, biology, chemistry, mathematics, physics, physiology and psychology is desirable. The University requires that applicants must arrange for official transcripts of all prior college level courses they have taken and their results in the Graduate Record Examination (taken within the last two years) to be sent to the Office of Graduate Education, USUHS. Students may elect to submit in support of their application scores obtained in one or more Graduate Record Examination Subject tests from the subject areas listed above. Applicants must also arrange for letters of recommendation from three persons who are familiar with their academic work to be sent to USUHS. In addition, applicants whose native language is not English must submit their results in the test of English as a Foreign Language (TOEFL), unless their undergraduate education has been at an accredited academic institution in the USA or at an equivalent academic institution in an English speaking country, or unless the Program Director decides that this test is unnecessary.

Students transferring into the Neuroscience Program from other institutions may transfer academic credit to meet the Neuroscience and Graduate Program requirements, with the approval of the USUHS Graduate Education Committee and the Neuroscience Executive Committee.

Advisors and Advisory Committees

A Temporary Advisor will be assigned for each student at the time of matriculation at USUHS. The Temporary Advisor will serve until a Dissertation Advisor (Major Advisor) is appointed by the Program Director (see below). The Temporary Advisor will be appointed by the Program Director. The Temporary Advisor, acting in consultation with the Program Director and the Executive Committee, will provide guidance in

developing a schedule of courses and laboratory rotations, will monitor the student's academic progress, and will serve as an advocate for the student during his/her first year of study. The Temporary Advisor will make recommendations to the Neuroscience graduate faculty concerning corrective action or dismissal of students in academic difficulty.

At the end of the first year of study a Dissertation Advisor (Major Advisor) will be selected by mutual agreement between the student and a faculty member in the Neuroscience Program. The selection must be approved by the Director of the Neuroscience Program. The Dissertation Advisor must have an active ongoing research program from which the student can benefit. The Dissertation Advisor will provide guidance in selecting advanced courses and in the selection of a dissertation research project. The Dissertation Advisor will supervise all research activities of the student.

Course Requirements

The basic structure of the course work section of the Program is divided into required Core Courses and approved Electives. The student must successfully complete a minimum number of 48 course credit hours and a total number of 148 credit hours (core course requirements, electives and research credits). Students must maintain an average grade of 3.0 (B) or better throughout graduate training to remain in good academic standing in the Program. The required curriculum consists of the core courses and electives, training rotations in research laboratories, and completion of a research dissertation. Opportunities for students to obtain teaching experience in neuroscience courses are available.

Required Courses

Year 1

Fall Quarter:

Introduction to Neuroscience
Biostatistics I or Experimental Statistics
Biochemistry
Neuroscience Seminar
Research Rotation

Winter Quarter:

Neuroanatomy (Head and Neck Anatomy)
Introduction to Neurophysiology
Neuroscience Seminar
Research Rotation

Spring Quarter:

Advanced Topics and Techniques in Neuroscience
(taken year 1 or 2 as offered)
Introduction to Neurophysiology (cont.)
Neuroscience Seminar
Neuroscience Tutorial (Seminar presentation)
Research Rotation

Year 2

Fall Quarter:

Ethics and Responsible Conduct of Research
Neuroscience Seminar
Neuroscience Research

Winter Quarter:

Neuropharmacology
Neuroscience Seminar
Neuroscience Research

Spring Quarter:

Biological Bases of Disorders of the Nervous System (taken year 1 or 2 as offered)

Neuroscience Seminar

Neuroscience Tutorial (Seminar presentation)

Elective Courses Currently Offered

In addition to the required core courses, students must select at least twelve credit hours from among approved elective courses. These include:

Anatomy Department:

Practical Histological Techniques

Gross Anatomy

Microscopic Anatomy

Special Senses

Biochemistry Department, and Molecular and Cell Biology Program:

(i) strongly recommended:

Cell Biology I and II

(ii) other electives:

Introduction to Computers

Membrane Biochemistry

Macromolecule-Ligand Interactions

Techniques Used in Cellular and Molecular Biology

Eucaryotic Gene Expression

Genetics

Microbiology Department:

(i) strongly recommended:

Fundamentals of Immunology

(ii) other microbiology electives:

Cellular and Molecular Immunology

Eukaryotic Gene Expression

Techniques in Molecular Biology

Fundamentals of Virology

Medical Psychology Department:

Appetitive Behaviors

Stress

Psychopharmacology

Behavioral Pharmacology

Psychoneuroimmunology

Cognitive Psychology

Pathology Department:

General Pathology

Recombinant DNA Technology and Applications

Pharmacology Department:

Novel Concepts in Neurotransmission

Recent Progress in Cellular and Molecular Endocrinology

Concepts in Drug Metabolism and Toxicology

Physiology Department:

Sensory Neurophysiology

Experimental Neurophysiology

Laboratory Rotations

During the first year of study, each student is required to take three laboratory training rotations, each of at least twelve weeks duration,

in research laboratories on the USUHS campus selected by the student with the advice of his/her Temporary Advisor. All laboratory rotations must be approved by the Program Director. Rotations must be taken in at least two academic departments. Upon completion of each laboratory rotation a concise report must be submitted to and approved by the laboratory rotation supervisor.

Qualifying Examination

Upon completion of required course work (core courses) at a time to be determined by the Program Director, and no later than the end of the second year of study, a comprehensive Qualifying Examination in Neuroscience shall be taken by the student. This examination will be administered and the student's performance evaluated by the Qualifying Examination Committee.

The Qualifying Examination shall consist of written papers and an oral examination. A Qualifying Examination Committee consisting of five Faculty Members in the Neuroscience Program, with members from at least three Academic Departments shall be appointed for each student by the Program Director no less than two months before the scheduled date for the examination.

Written Papers: The student will consult individually with members of his/her Examination Committee to define topic areas of interest to both the student and the faculty member. Each of the five faculty members will then prepare a question or problem relating to the jointly selected topic area. Questions or problems should be broad-based and designed to test aspects of knowledge and research in neuroscience and related areas. The student will write a paper of about ten pages on each of three of the five questions presented to the student. These papers are expected to present a scholarly discussion of the question including recent developments in the field, and should be adequately referenced taking into account the imposed space limitations. The student should discuss the topics with Qualifying Examination Committee members (and other members of the Neuroscience Faculty) but the student should not ask faculty to edit or correct the Qualifying Examination papers before they are formally submitted. The papers must be submitted to the Chair of the Qualifying Examination Committee within 6 weeks from the date the examination questions were given to the student. Committee members are expected to provide an initial evaluation of the written papers on their topic areas within one week. The Chair will read all three written papers. If the Examination Committee agrees that the papers are of adequate quality, the student will be permitted to take the oral part of the examination.

Oral Examination: In a specified time (within 8 to 12 weeks) after the questions have been set, the student will be questioned by the Qualifying Examination Committee.

Committee Members: The oral portion of the examination will test general and specific knowledge in all five of the chosen topic areas. Members of the Neuroscience Executive Committee (and other Neuroscience Faculty members, at the discretion of the Program Director) may attend the oral part of the examination but will not participate in the questioning of the student.

After the Oral Examination, Qualifying Examination Committee members will be asked to vote on the student's performance in (a) the written papers, and (b) the oral examination. Satisfactory performance in both parts of the examination is required for passage of the Qualifying Examination. In each case decisions will be made by a majority vote of the five member Committee. The Committee may decide the student has passed both parts of the examination, has passed the written examination

but failed the oral examination (in which case the oral examination shall either be retaken, with the same Executive Committee, within a period of two months, or the student may be directed to re-take both parts of the examination, at the discretion of the Program Director; a second oral examination shall count as a second attempt at passage of the Qualifying Examination), or has failed both parts of the Examination. In the event that a student is deemed to have failed the examination, the Committee may recommend that he/she be dismissed from the program, or that he/she may retake the examination within a period of no longer than four months. A student who fails the Qualifying Examination twice will be recommended for dismissal from the program. The Chair of the Qualifying Examination Committee will provide the Program Director with a written report on the examination and the committee's decision.

Advancement to Candidacy

Recommendation for advancement to candidacy for the Ph.D. Degree in neuroscience will require completion of the required core courses, satisfactory performance in the laboratory rotations and in the Qualifying Examination, and presentation of a statement of satisfactory performance in laboratory research from the Student's Dissertation Advisor.

Dissertation Committee

Upon the appointment of a Dissertation Advisor (normally at the end of the student's first year of study), a Dissertation Committee will be appointed for the student. The Dissertation Committee will be recommended to the Associate Dean for Graduate Education by the Program Director after consultation with the Dissertation Advisor and the student. The Dissertation Committee will consist of the student's Dissertation Advisor and at least four other faculty members, at least three of whom will be selected from the Neuroscience Faculty. One committee member must be a full-time USUHS faculty member selected from outside the Neuroscience Program and outside the Dissertation Advisor's department. If desired, additional Dissertation Committee members may be appointed from within or from outside the USUHS. The student's Dissertation Advisor may not serve as Chair of the Committee. The Chair of the Committee will be appointed by the Program Director.

The Dissertation Committee will advise the student through periodic and timely meetings, will evaluate and determine the acceptability of a dissertation proposal submitted by the student, and will evaluate the progress of the student's research and his/her readiness to take the final examination. The Committee will review the doctoral dissertation, attend the public presentation of the dissertation research, and question the student in a closed examination to determine whether to recommend to the Neuroscience Faculty that the degree of Doctor of Philosophy in Neuroscience be awarded.

Dissertation Research Proposal

A research plan describing the proposed dissertation research project shall be formulated and written by each neuroscience graduate student with the advice of their thesis advisor. The intent of the written dissertation research plan is to present a focused, and scholarly presentation of a research problem and plan of experiments. The relatively early presentation of the plan in the research training of the student is intended to promote critical and analytical thinking, focused research effort, and extensive interaction with the thesis committee throughout the research. The research plan will be prepared and presented to the dissertation advisory committee within 1 year subsequent to advancement to candidacy. Exceptions to this timetable must be approved (in advance) by the student's dissertation advisory

committee and the Neuroscience Program executive committee.

The format of the dissertation research plan will be that of research proposal component of a grant application. The written dissertation research plan will be distributed to the dissertation advisory committee for review prior to an oral presentation and discussion of the plan. A majority of the committee must approve the plan with or without modifications. Substantive modifications will be incorporated into a revised proposal. A copy of the approved proposal and written notification of its approval by the committee will be provided to the director of the Graduate Program in Neuroscience. Subsequent to the approval of the written dissertation research plan and with the approval of the dissertation committee, the student's research plan may be altered to reflect new information and/or unexpected experimental results.

The written dissertation research plan will consist of the following sections, be typed (double spaced) using a font that contains no more than 15 characters/inch, and be no longer than 40 pages in length (excluding figures of preliminary data, and list of cited literature).

Description (Abstract). Briefly summarize the proposal's objectives, and specific aims. Describe concisely the research design and methods for achieving these goals. The description should serve as a succinct description of the proposed work when separated from the proposal. (no more than one page)

Background and significance. This section should be a focused presentation of the relevant background to the proposal. Important and timely literature should be cited, however, an exhaustive review of the literature in the field need not be presented. Briefly sketch the background leading to the proposed studies, critically evaluate existing knowledge, and specifically identify the gaps which the project is intended to fill. (about 8 pages recommended).

Specific Aims. This section must state the hypothesis to be tested, and list each of the specific aims to be accomplished by the proposed studies. (1-2 pages recommended)

Preliminary Data. The required presentation of the research plan within 1 year after advancement to candidacy, may preclude the inclusion of a large body of preliminary data. However, data obtained by the student and which supports the feasibility of the study and/or the methods proposed should be included.

Experimental Design and Methods. For each specific aim, this section should describe the rationale for the experiments, the experimental design of the experiments and the methods to be used. In addition, the means by which the data will be collected, analyzed and interpreted are to be included. Discuss potential difficulties and limitations of proposed procedures and potential alternate approaches to achieve the aims. This section should also include information on the care and use of vertebrate animals, and information on the safe use and handling of toxic chemicals and/or biohazards to be used in the proposed studies.

Literature Cited. Literature citations must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication.

Review of Student Progress

An annual review will be conducted of each student in the Program by the Neuroscience Executive Committee to evaluate the student's progress and status in the Program. The student must remain in good academic standing and perform satisfactorily in research work throughout graduate training. Failure to achieve a B grade in required courses warrants special consideration. Unsatisfactory performance and for a grade point average of less than 3.0 (B) will result in recommendation by the Program Director of remedial work, or a recommendation for dismissal. The recommendation will be submitted to the Dean, School of Medicine, through the Graduate Education Committee. The Ph.D. Program must be completed within seven years of matriculation.

Dissertation Research Requirements

Dissertation. A written dissertation based on the original experimental research is required. A complete draft of the thesis will be thoroughly reviewed by the thesis advisor and approved by him/her to be forwarded to the Thesis Advisory Committee. The Thesis Advisory Committee will have a minimum of 2 weeks to review the manuscript.

Dissertation Defense. A closed defense of the dissertation will be conducted by the Thesis Advisory Committee in no less than two weeks following their receipt of the draft dissertation. The candidate will formally review his/her work in a brief presentation (not a full seminar), and answer questions posed by members of the Thesis Advisory Committee. Other faculty members will be allowed to attend this meeting with permission of the Chair of the Thesis Advisory Committee. However, the meeting is not open to the public. The Thesis Advisory Committee will vote to determine whether to proceed with the Public Seminar. The Thesis Advisory Committee may approve the Dissertation at this time or may wait until the Public Seminar and/or the completion of required corrections/changes to approve the thesis. If the Thesis Advisory Committee, by majority vote, determines that the Dissertation is unsatisfactory, the Committee will determine what corrective actions must be taken. When the Thesis Advisory Committee determines that the Public Seminar is to be scheduled, the Chair of the committee will request (through the Director of the Neuroscience Program) that the Office of Graduate Education schedule the seminar for a time approximately 2 weeks later. Announcements for the seminar are prepared by the Office of Graduate Education.

Public Seminar. The candidate will present a scholarly and serious presentation of his/her thesis research in a 50 min public seminar. At the end of the Public Seminar, the candidate will answer questions from the audience. The presentation and the candidate's responses to questions will be evaluated by the Thesis Advisory Committee and provide the basis for approval of the Public Seminar component of the Ph.D. dissertation.

Following the Public Seminar, the Thesis Advisory Committee will conduct a closed discussion with the candidate. The results of the Thesis Advisory Committee's evaluation of the Public Seminar will be recorded. Upon approval by the Thesis Advisory Committee of the Dissertation and of the Public Seminar (with signatures obtained from all members of the Committee), the results will be transmitted to the Associate Dean for Graduate Education. In the event of an unsatisfactory outcome, the Thesis Advisory Committee will recommend a course of action to Director of the Neuroscience Program.

Faculty

Helke, Cinda J., B.S., Ph.D.

(Creighton University, 1974; Georgetown University, 1978)

Professor of Pharmacology

Director, Neuroscience Program

Agoston, Denes, M.D., Ph.D., D.Sc.

(University Medical School Szeged, 1976; Hungarian Academy of Science, 1992)

Associate Professor of Anatomy and Cell Biology

Anders, Juanita J., B.A., M.S., Ph.D.

(Wilkes College, 1969; Pennsylvania State University, 1972;

University of Maryland, 1977)

Associate Professor of Anatomy and Cell Biology

Armstrong, Regina, B.S., Ph.D.

(University of Rochester, 1982; University of North Carolina, 1987)

Associate Professor of Anatomy and Cell Biology

Borke, Rosemary C., B.S., Ph.D.

(Mary Washington College, 1961; George Washington University, 1979)

Professor of Anatomy and Cell Biology

Bryant, Howard J., B.A., M.S., Ph.D.

(San Diego State College, 1963, 1965; University of Arizona, 1973)

Associate Professor of Physiology

Côté, Thomas E., B.A., Ph.D.

(University of Maine, 1970; S.U.N.Y. Downstate Medical Center, 1975)

Associate Professor of Pharmacology

Coulombe, James N., B.A., Ph.D.

(University of California, 1977, 1986)

Assistant Professor of Anatomy and Cell Biology

Cox, Brian M., B.Sc., Ph.D.

(Chelsea College of Science and Technology, 1962;

University of London, 1965)

Professor and Chair of Pharmacology

Deuster, Patricia A., A.B., M.S., Ph.D., M.P.H.

(College of William and Mary, 1971, 1978; University of Maryland, 1982;

Uniformed Services University of the Health Sciences, 1996)

Associate Professor of Military and Emergency Medicine

Grieder, Franziska B., D.V.M., Ph.D.

(University of Zurich, Switzerland 1984; University of Wisconsin, 1989)

Assistant Professor of Microbiology and Immunology

Grunberg, Neil E., B.S., M.S., Ph.D.

(Stanford University, 1975; Columbia University, 1977, 1980)

Professor of Medical and Clinical Psychology

Gunderson, Carl H., B.S., M.S., M.D.

(University of Notre Dame, 1954; University of Chicago, 1958)

Professor of Neurology

Guzowski, John, Ph.D.

(University of California, 1994)

Adjunct Assistant Professor, Neuroscience Program

Holloway, Harry, M.D.

(University of Oklahoma, 1958)

Professor of Psychiatry

Juliano, Sharon, B.A., O.T.R., Ph.D.

(Temple University, 1972; University of Pennsylvania, 1974, 1982)
Professor of Anatomy and Cell Biology

Li, He, M.D., Ph.D.

(Fujian Medical University, 1983, 1988; McGill University, 1994)
Assistant Professor of Psychiatry

Lewandowski, Gail, Ph.D.

(University of North Carolina, Chapel Hill, 1990)
Adjunct Assistant Professor, Neuroscience Program

Ling, Geoffrey, B.S., M.D., Ph.D.

(Cornell University, 1982; Georgetown University, 1989)
Assistant Professor, Departments of Anesthesiology, Neurology and Surgery

Marini, Ann, B.A., Ph.D., M.D.

(Erskine College, 1971; Georgetown University, 1978, 1980)
Assistant Professor of Neurology

McCabe, Joseph T., B.A., M.S., Ph.D.

(Rutgers College, 1974; University of Wisconsin-Oshkosh, 1976; The City University of New York, 1983)
Professor of Anatomy and Cell Biology

McKinney, Leslie, Ph.D.

(Washington University, 1976, 1982)
Adjunct Assistant Professor, Neuroscience Program

Messersmith, Donna, Ph.D.

(Georgetown University, 1991)
Research Assistant Professor of Anatomy and Cell Biology

Mueller, Gregory P., B.A., Ph.D.

(University of Montana, 1971; Michigan State University, 1976)
Professor of Physiology

Norwood, Ann E., M.D.

(Uniformed Services University of the Health Sciences, 1981)
Associate Professor of Psychiatry

O'Neil, John T., B.S., Ph.D.

(University of Maryland, 1972; Johns Hopkins University, 1980)
Research Assistant Professor of Pediatrics and Physiology

Pollard, Harvey B., M.D., Ph.D.

(University of Chicago, 1969, 1973)
Professor and Chair of Anatomy and Cell Biology

Porter, Linda L., B.S., Ph.D.

(McGill University, 1978; Boston University, 1985)
Associate Professor of Anatomy and Cell Biology

Poth, Merrily P.M., B.A., M.D.

(University of Iowa, 1964; Tulane University School of Medicine, 1975)
Professor of Pediatrics

Rollag, Mark C., B.S., Ph.D.

(Colorado State University, 1971, 1977)
Professor of Anatomy and Cell Biology

Rosenberg, Michael L., B.S., MMS, M.D.

(Yale University, 1972; Rutgers Medical School, 1974; Baylor College of Medicine, 1976)

Professor of Neurology

Salazar, Andres M., B.A., M.D.

(Dartmouth College, 1964; Jefferson Medical College, 1968)

Professor of Neurology and Director, Army Head Injury Unit, USUHS

Sarvey, John M. B.A., Ph.D.

(Williams College, 1969; State University of New York at Buffalo, 1976)

Professor of Pharmacology

Shea-Donohue, Terez, B.A., Ph.D.

(Wheaton College, 1973; Georgetown University, 1979)

Associate Professor of Medicine

Symes, Aviva, B.Sc., Ph.D.

(University of Manchester, 1985; University College of London, 1990)

Assistant Professor of Pharmacology

Tatham, Thomas A., B.A., Ph.D.

(Temple University, 1982, 1987)

Research Assistant Professor of Psychiatry

Ursano, Robert J., M.D.

(Yale University, 1973)

Professor and Chair of Psychiatry

Verma, Ajay, B.S., M.D., Ph.D.

(University of Maryland, 1984; Johns Hopkins University, 1991, 1992)

Assistant Professor of Neurology

Wong, Kondi, M.D.

(Uniformed Services University of the Health Sciences, 1988)

Assistant Professor of Pathology

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Graduate Degree Program in Pathology

Pathology is a very broad scientific discipline which includes many aspects of genetics, immunology, molecular biology and other fields related to human disease. Our graduate programs recognize these diverse training requirements, and are designed to be quite flexible in order to accommodate the interests and needs of individual students. Students with advanced degrees (MD, DDS) are encouraged to apply. Credit may be given for prior course work. The Department of Pathology offers 2 graduate programs leading to the Ph.D. degree:

The Molecular Pathobiology Graduate Program was designed for students with background in biology, chemistry, molecular biology or related disciplines who have B.A. or B.S. degrees and who wish to study human diseases.

The Comparative Pathology Graduate Program was developed for students who have D.V.M. degrees and a minimum of two years residency or preceptorship training and who wish to pursue further graduate studies leading to the Ph.D. degree.

The graduate programs include core courses in biochemistry, pathology, molecular biology, microbiology, and immunology. A variety of other courses may be taken as electives. These include a large selection of graduate courses in all preclinical departments at USUHS and graduate course offered through the Foundation for Advanced Education in the Sciences, Inc. (FAES) taught by NIH staff members. A total of 48 formal course credits is required for the Ph.D. degree. A comprehensive written and oral qualifying examination is given upon the completion of course work, usually within 2 years after admission to the program.

Our graduate programs place a strong emphasis on research experiences. During the first year, every graduate student rotates through several laboratories in order to learn research methods. Normally, by the end of the first year, a research mentor is selected and the student begins research leading to the Ph.D. dissertation. Throughout their graduate training, our graduate students frequently present journal clubs and research seminars to their peers and to faculty-student groups. We believe that skills in oral and written presentation are essential components of a successful scientific career. Advanced graduate students are expected to present their research results at appropriate national meetings.

An advisory committee for each student meets with the student several times each year to plan a program of courses and research experiences and to evaluate the student's progress.

Admission Requirements

Applicants are accepted only as full-time students and must devote full-time effort to the Graduate Training Program in the Department of Pathology.

For the Molecular Pathobiology Graduate program applicants must have obtained a baccalaureate degree prior to matriculation at USUHS and must have completed college level courses in calculus, biology, physics, and chemistry. For the Comparative Pathology major, applicants must have a background in general and veterinary pathology, including a DVM degree

with a minimum of two years residency or preceptorship training, and preferably, ACVP board eligibility. These prerequisites reflect the specific requirements of the Department of Defense for scientists with a Veterinary Pathology background, and for Ph.D. graduate training in Comparative Pathology.

Advanced level courses in biology, chemistry, or related fields such as biochemistry, physical chemistry, microbiology, molecular biology, anatomy, cell biology, immunology, or genetics, are desirable but not essential.

In addition to the standard USUHS graduate training application form, the department requires the following documents: complete academic transcripts of post-secondary education, results of the Graduate Record Examination (including one advanced study examination), three letters of reference from individuals familiar with the academic work or scientific achievements of the applicant, and a personal statement from the applicant expressing his or her career objectives.

Course Requirements

The department requires that students in both the Comparative Pathology major and the Molecular Pathobiology major meet general requirements in the following areas: Pathology, Biochemistry, Microbiology and Molecular and Cell Biology. These requirements should be satisfied by successful completion of medical or graduate course offerings in these subjects. In general, the Molecular Pathobiology major will emphasize pathogenic mechanisms, microbiology, biochemistry, cell and molecular biology and basic medical sciences. The Comparative Pathology major will emphasize molecular biology, comparative pathology and clinical pathology.

The course work of the program is divided into a core curriculum and approved electives. The student must successfully complete a total of 148 credit hours consisting of core courses (which are the mandatory component of course work leading to Ph.D. candidacy), electives and research credits. Forty eight (48) of these credits will be required before advancement to Ph.D. candidacy. Exemption from these requirements will be considered (1) for equivalent course credit earned at another accredited graduate school, or (2) demonstration to the student's Advisory Committee of proficiency in the specific subject.

The core curriculum is comprised by the Medical School course offering in Pathology (PA02001) (equivalent to the following department of Pathology graduate courses: General Pathology (PA0501) and Pathology of Organ Systems (PA0506)), Anatomy I (AT01010), Medical Biochemistry (BC01001), Topics in Pathogenesis (PA052), Cell Biology I and II (MCB507 and 508), Techniques Used in Cellular and Molecular Biology (equivalent to the Pathology Department Course Recombinant DNA Techniques and its Applications (PA0505)) and Mechanisms of Growth Control in Neoplasia (PA0510). Credit earned in Pathology Seminars (PA0601), Research in Molecular Pathology (PA0901) and Research in Comparative Pathology (PA0902) will not be counted towards the 48 credits required for advancement to Ph.D. candidacy.

In addition to these courses, the students may choose, as electives, with the approval of his/her Advisory Committee, courses offered in other departments at USUHS and courses given at the FAES (NIH) Bulletin.

Qualifying Examination

A qualifying examination shall be administered to the student upon successful completion of required formal courses and within two years of admission to the program. The qualifying examination will be in the

format of a research grant proposal. In conjunction with the Advisory Committee, the student will choose a research topic different from their thesis topic. The student will read and review the primary literature and prepare a proposal to address the specific research question. Satisfactory performance on the qualifying examination will be decided by majority vote of the Graduate Affairs Committee. At the discretion of the student's Advisory Committee, a failed examination may be repeated one time only. Failure to pass the qualifying examination on two occasions will result in discharge of a student from the Ph.D. Program.

Language Requirements

A reading knowledge of one foreign language or demonstration of proficiency in computer usage will be required. This requirement may be satisfied by completion of a two-year sequence of college level courses in a foreign language with a passing grade or by a passing score on the Educational Testing Service Foreign Language Proficiency Examination.

Departmental Duties and Responsibilities

Each graduate student will be considered a member of the Department of Pathology and, will be expected to perform Departmental duties as part of his or her graduate training. These duties will include participation in the teaching activities of the Department. Also, each Comparative Pathology graduate student will have both Clinical Pathology and Anatomic Pathology duties within Diagnostic Services and Comparative Medicine.

Major Advisor and Advisory Committee

At the time of matriculation, each student shall be assigned to a committee of three faculty members, appointed by the Department Chairperson, that will serve as a temporary advisory committee. During the first three academic quarters of graduate study, the student will attend classes and may also work in several faculty laboratories, participating in the laboratory experiments and discussions. Selection of laboratory rotations will be by mutual consent of the graduate student and the involved faculty members, and both courses and laboratory rotations will be arranged with the advice and consent of the student's temporary advisory committee. These procedures are designed to facilitate the selection of an area for thesis research and a major advisor for each graduate student. Normally, by the end of the first six academic quarters of graduate study, the student will submit to the Graduate Affairs Committee a list of his or her preferences for faculty members to serve as the major advisor. The Graduate Affairs Committee will review the preferences both of graduate students and of faculty members and must approve assignments of students to major advisors.

At the time that a major advisor is selected, the Department Chairperson will also appoint an Advisory Committee. The Advisory Committee shall represent a broad range of expertise and will include the student's major faculty advisor as chairman (except during the qualifying examination, as noted above), three additional faculty members associated with the departmental Graduate Training Program, and one faculty member from another department at USUHS. In addition to supervising the student's program of study, research, and dissertation preparation, the Advisory Committee shall be responsible for evaluating the student's progress, for administering the qualifying examination for advancement to candidacy, and for assessing the student's readiness to take the final examination in defense of the dissertation. The committee shall meet at least twice yearly to review the student's progress. All questions shall be decided by simple majority vote.

Evaluation of Student Progress

Starting at the end of the first year, the student will submit a brief annual written progress report to his or her Advisory Committee. At regular intervals, students will also present seminars to the department faculty based on the scientific literature and on his/her original research project.

The Advisory Committee will review the work of the student and make annual recommendations to the departmental Graduate Affairs Committee concerning continued participation of the student in the graduate training program. Recommendations to discharge students from the program must be approved by a two-thirds vote of the Graduate Affairs Committee and have the concurrence of the Department Chairperson before they are forwarded to the Graduate Education Committee for consideration.

Advancement to Candidacy

Candidates for the Ph.D. degree must complete all requirements for advancement to candidacy no later than two years after initiating a program of graduate study at USUHS. Exceptions can be granted only on the recommendation of the student's Advisory Committee and with the approval both of the Department Chairperson and of the USUHS Graduate Education Committee. Requirements for advancement to candidacy include completion of the minimal requirement of 48 quarter credit hours of formal course work at the graduate level, successful completion of the qualifying examination, and completion of the language or computer science requirement.

Research Requirements

Original experimental work is an essential part of graduate training. Research endeavors are expected to be individualized within an area of interest to each student. Furthermore, for Comparative Pathology, it is expected that experimental work will be suitable for the essential needs of the Department of Defense/U.S. Army. A written dissertation based on the student's original experimental work shall be prepared by the student with the supervision of the major advisor and the Advisory Committee. The dissertation may consist of the student's publications and a general introduction to the work described in the publications.

Dissertation Defense

A Dissertation Examination Committee will be formed to read the dissertation, to certify its acceptability as to scope and quality, and to conduct the defense of the dissertation. In accordance with University regulations, the chairman of the Dissertation Examination Committee is appointed by the Associate Dean for Graduate Education and must be a USUHS faculty member other than the student's major advisor. The other four members of the committee shall be appointed by the Department Chairperson. One of these four must be from outside the Department of Pathology and may be from USUHS or another institution. The defense of the dissertation will consist of a public seminar (which may include an open discussion and question period), followed by an oral examination that will be closed to the public. The format of the final oral examination will be determined by the Dissertation Examination Committee. The Dissertation Examination Committee shall transmit its evaluation to the Graduate Affairs Committee. The chairman will inform the Associate Dean for Graduate Education of the outcome of the dissertation and dissertation examination. If either the dissertation or the oral defense is unsatisfactory, this Department stipulates that the Dissertation Examination Committee shall formulate recommendations for appropriate remedial action including, but not limited to, the following: (1) revision of the dissertation; (2) revision of the

dissertation only after performance of specified additional research; and (3) repetition of the oral defense after a specified interval of time. In no case will more than one repetition of the dissertation defense be permitted. An unsatisfactory performance of the repetition of a dissertation defense will result in the discharge of a student from the Ph.D. program.

Faculty

Friedman, Robert M., M.D.

(New York University, 1958)

Professor and Chair of Pathology

Conran, Richard M., COL, USA, M.D., Ph.D., J.D.

(SUNY at Buffalo, 1979; Albany Medical College, 1983; American University, 1999)

Associate Professor of Clinical Pathology

Contente, Sara, Ph.D.

(New York University, 1980)

Research Assistant Professor of Pathology

Cutler, Mary Lou, Ph.D.

(Lehigh University, 1974; Allegheny-MCP-Hahnemann School of Medicine, 1980)

Assistant Professor and Graduate Program Co-Director

Daly, Michael, Ph.D.

(University of London, 1988)

Assistant Professor

Dveksler, Gabriela, Ph.D.

(Uniformed Services University of the Health Sciences, 1991)

Associate Professor of Pathology

Grimley, Philip M., M.D.

(Albany Medical College, 1961)

Professor of Pathology

Kagan, Elliott, M.B., B.Ch., M.R.C. Path

(University of the Witwatersrand, 1964; Royal College of Pathologists, 1985)

Professor of Pathology and Preventive Medicine & Biometrics

Katz, Rachel, LCDR, MC, USN, M.D.

(The Chicago Medical School, 1991)

Assistant Professor

Levitt, Morton, COL, USAF, MC, M.D.

(Duke University School of Medicine, 1972; Duke Graduate School, 1981)

Associate Professor

Maheshwari, Radha K., B.S, M.S., Ph.D.

(Lucknow University, 1968; Birla Institute of Technology and Science, 1970; Kanpur University, 1974)

Professor of Pathology and Graduate Program Director

Marty, Aileen M., CDR, MC, USN, M.D.

(University of Miami Medical School, 1982)

Associate Professor of Pathology

Rollwagen, Florence, Ph.D.

(Cornell University/Sloan-Kettering Division, 1979)
Research Associate Professor

Rui, Hallgeir, M.D., Ph.D.

(University of Oslo, Norway, 1988)
Assistant Professor of Pathology

Snapper, Clifford M., M.D.

(Albany Medical College, 1981)
Professor of Pathology

Stocker, Thomas J., COL, MC, USA, M.D.

(University of North Dakota, 1966; Northwestern University Medical
School, Chicago, 1969)
Professor of Pathology

13

Graduate Degree Program In Pharmacology

Pharmacology is concerned with the actions of chemicals (including drugs) on biologic systems. Modern pharmacological research is directed at elucidating the mechanisms of drug action at the molecular, cellular, systems and behavioral levels, and the application of this knowledge to the rational and effective use of existing drugs and to the development of novel therapeutic agents. The specific research strengths of the Department of Pharmacology include molecular and cellular studies in signal transduction and cell regulation, immunopharmacology, neuropharmacology and bioinformatics.

The Department of Pharmacology encourages students with interests in pharmacological research in the areas of molecular and cell biology or neuroscience to seek admission to these interdisciplinary graduate programs at USUHS. These programs offer the broad-based education necessary for a successful career in biomedical science. Pharmacology faculty members are actively involved in the teaching activities of these programs and accept students from the interdisciplinary programs into Department laboratories for their dissertation research.

In special cases, the Department offers a program of study and research training leading to the Ph.D. Degree. Applicants who wish to obtain a Masters Degree in pharmacology will not ordinarily be admitted. Graduate study in the Department of Pharmacology is regulated by the rules of the University and those of the Department. Departmental requirements supplement, but do not replace, University requirements.

Admission Requirements

The Department of Pharmacology requires applicants to satisfy all University requirements for admission. Applicants should provide complete academic transcripts of all undergraduate work and any prior graduate studies. Applicants should arrange for three letters of reference from individuals familiar with the student's academic record, and for the results of the applicant's performance on the Graduate Record Examination to be forwarded to the University. Students whose native language is not English must take the Test of English as a Foreign Language (TOEFL) and have their score sent to the University.

Students are admitted with the understanding that they will devote full time to their studies. Concurrent enrollment in other degree granting programs or outside employment is not permitted.

Major Advisor and Advisory Committee

At matriculation, the student will be assigned a temporary faculty advisor by the Director of Graduate Training. In the first three academic quarters, the student will attend classes and rotate through three or more laboratories and participate in laboratory activities and discussions. This procedure is designed to acquaint the student with the various research activities in the Department. At the beginning of the first summer, the student will submit a request to the Graduate Affairs Committee for assignment of a Major Advisor in whose laboratory the student wishes to pursue his/her thesis research. Upon approval, the student, in association with his/her Major Advisor, will form an Advisory Committee whose members shall include the Major Advisor and three additional members of the Department of Pharmacology faculty, and one USUHS faculty member from another Department. Additional members

from inside or outside the University may be appointed with the approval of the Graduate Affairs Committee and the Department Chairperson.

The Major Advisor will direct the student's academic work and thesis research program, and, with the advice of the Advisory Committee, provide guidance during the preparation of the dissertation. The Advisory Committee shall be responsible for evaluating the progress of the student's research and of his/her readiness to take the final examination.

Course Requirements

Students are expected to complete courses in Biochemistry, Physiology, Biostatistics, Immunology, and Graduate and Medical Pharmacology. These requirements are normally satisfied by the successful completion of graduate or medical course offerings in these areas. Exemption from these requirements will be considered for equivalent course credit earned at another accredited medical or graduate school, or by demonstration to the student's Advisory Committee of proficiency in the specific subject. In addition, the student, in conjunction with the Major Advisor, will formulate a plan of course electives to provide specialized training in his/her particular area of interest. This plan shall be submitted for approval to the Thesis Advisory Committee by the beginning of the second year of study. All students must maintain a "B" average or better to remain in good academic standing.

Qualifying Examination

Upon completion of required course work, and not later than the end of the second year of study, a Qualifying Examination in pharmacology and related subjects to evaluate the student's suitability for advancement to candidacy will be administered to the student by a committee appointed by the Director of Graduate Studies. The Examining Committee shall be composed of four members of the Department faculty and one member of the USUHS faculty from another Department. Students are examined orally to ascertain their mastery of required course material. Satisfactory performance will be determined by a simple majority vote of the Examining Committee. Students with a deficiency in a single area may, at the discretion of the Committee, be re-examined in that area alone. Deficiency in more than one area will require that the student retake the entire examination. A student may take the Qualifying Examination a maximum of two times.

Advancement to Candidacy

Candidates for the Ph.D. degree must complete all of the requirements for advancement to candidacy no later than two years after matriculation. Exceptions will be granted only on the recommendation of the student's Advisory Committee and approval of both the Graduate Affairs Committee of the Department and the Graduate Education Committee of the University.

Evaluation of Student Progress

Starting at the end of the second year, the student shall, at intervals of not less than six months, submit a brief written summary of research progress to his/her Advisory Committee. The Advisory Committee will review the work of the student and make recommendations to the Graduate Affairs Committee concerning the continued participation of the student in the graduate program. All questions will be decided by simple majority vote. A recommendation to disenroll a student from the Ph.D. program must be approved by a two-thirds vote of the Graduate Affairs Committee and the concurrence of the Department Chair. Students are expected to participate fully in Departmental seminar activities and to present the results of literature reviews or their own original research

at regular intervals.

Research Requirements

The student, with the advice of his/her Major Advisor, shall develop a written research proposal for approval of the Advisory Committee no later than the end of the third year of study. The proposal will describe the background and rationale of the project, the preliminary results, and the planned experimental design. Upon completion of the research plan, a written dissertation describing the student's original experimental work will be presented to the Advisory Committee. The Department expects that the dissertation will be completed and accepted within five years of matriculation.

Dissertation Defense

After initial review of the dissertation by the Advisory Committee, the student will present the results of his/her original research in a public seminar which will include open discussion and questions. This will be followed by a closed oral examination administered by the Advisory Committee, to ascertain the acceptability of the dissertation. If either the written dissertation or the oral defense is judged unsatisfactory, the Advisory Committee may recommend remedial action to the Graduate Affairs Committee of the Department. An unsatisfactory performance on a repetition of the defense will result in the discharge of the student from the program.

Teaching Requirements

The Department considers teaching to be part of the student's training; students will be expected to participate in the teaching activities of the Department when requested by the Department Chairperson.

Faculty

Cox, Brian M., B.Sc., Ph.D.

(Chelsea College of Science and Technology, 1962; University of London, 1965)

Professor and Chair of Pharmacology
Professor of Neuroscience
Director of Graduate Studies

Cote, Thomas E., B.A., Ph.D.

(University of Maine, 1970; S.U.N.Y. Downstate Medical Center, 1975)
Associate Professor of Pharmacology and Neuroscience

Cox, George W., B.A., Ph.D.

(Ohio Wesleyan University, 1982; Ohio State University College of Medicine, 1987)
Assistant Professor of Pharmacology and Molecular and Cell Biology

Harmon, Jeffrey M., B.S., M.S., Ph.D.

(The Cooper Union for the Advancement of Science and Art, 1971; University of Rochester, 1974, 1976)
Professor of Pharmacology and Molecular and Cell Biology

Helke, Cinda J., B.S., Ph.D.

(Creighton University, 1974; Georgetown University, 1978)
Professor of Pharmacology and Director, Neuroscience Program

Lechleider, Robert J., A.B., M.D.

(Princeton University, 1983; University of Illinois College of Medicine

at Chicago, 1990)
Assistant Professor of Pharmacology

Moore, A. Leon, B.S., Ph.D., B.S.

(Southwestern University, 1968; Vanderbilt University, 1975; University of Maryland University College, 1992)
Professor of Pharmacology
Interim Chair, Department of Biomedical Informatics

Sarvey, John M., B.A., Ph.D.

(Williams College, 1969; S.U.N.Y. Buffalo, 1976)
Professor of Pharmacology and Neuroscience

Symes, Aviva J., B.Sc., Ph.D.

(University of Manchester, 1985; University College, London, 1990)
Assistant Professor of Pharmacology, Neuroscience and Molecular and Cell Biology

Szallasi, Zoltan I., M.D.

(Debrecen University Medical School, Hungary, 1988)
Assistant Professor of Pharmacology and Molecular and Cell Biology

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Graduate Degree Program in Physiology

The Department of Physiology offers academic and research training leading to the Ph.D. degree. The graduate program is designed to provide students with an opportunity to pursue advanced studies in cellular, developmental, and molecular biology. It is intended to form the basis for a career in research and teaching. The Department of Physiology's objectives are to train students in techniques of biological research and to foster an understanding of the basic principles essential to the formulation, pursuit and completion of scientific studies. While the main thrust of the graduate program is aimed at research training, development of teaching skills is also emphasized.

Research programs within the Department of Physiology focus on the neural, cardiovascular, respiratory, endocrine, renal and gastrointestinal systems. The goal of the program is to provide students with comprehensive knowledge of body function with in-depth knowledge of one or more organ systems.

Admission Requirements

Applicants for admission must satisfy all of the University requirements for admission.

Program of Study

The program of study is divided into course work in physiology, anatomy, biochemistry, pharmacology, molecular and cellular biology and research toward the Doctor of Philosophy (Ph.D.) degree. The first year will include course work and participation in research experiences in 3 laboratories chosen by the student. If a student begins their program of study with a research advisor identified, research experiences in three laboratories will not be required.

Academic Advisors

During the first year the student will be assigned an academic advisor. If a student has identified a research mentor upon beginning their course of study, the research mentor will serve as the student's academic advisor. The faculty member who will be assigned this role must be a graduate faculty member. This assignment will be made randomly by drawing names of the available graduate faculty members. Available faculty members are defined as members of the graduate faculty of the Physiology Department who are not currently advising a student in their Graduate Program. The students and their academic advisors will meet at least once a year with the Departmental Graduate Affairs Committee (GAC) to inform the GAC about the student's progress.

Time Requirement

Students must complete their degree requirements within 7 years from the date of enrollment.

Course Requirements

There is a common core of required courses for the Departments of Physiology and Anatomy and Cell Biology. Beyond this core, students are required to take specific courses which will determine their respective Degree Program (for example: Renal Physiology, Cardiovascular

Physiology).

The minimal requirements for a Ph.D. in Physiology are 48 credit hours of graded course work and 144 total credit hours. Up to 24 transfer credits can be applied to this requirement with approval of the GAC. Transfer credits are assigned without grades and therefore do not contribute to the G.P.A. A minimum of twelve credit hours per quarter is required for full time student status. Students must complete a minimum of 24 graded credit hours by the end of the Spring Quarter of their first year. At this time the GAC will assess the student's progress and status. The course work during the first and second years will consist of required and elective courses. By the end of their second year all graduate students must a) complete their 48 graded credit hours with a G.P.A. of 3.0 or better, b) pass their qualifying examination and c) be advanced to candidacy for the degree of Ph.D.

Required Graded Core Courses for Physiology Graduate Students

1. Medical Physiology with a grade of B or better.
2. Scientific Methods & Laboratory Techniques I and II.
3. Two semesters of Cell Biology or Pharmacology.
4. Introduction to Computers if a student has not had computer training in a course approved by the GAC.
5. Biostatistics if a course in Biostatistics approved by the GAC has not been completed.
6. Genetics if a course in Genetics approved by the GAC has not been completed.
7. Biochemistry if a course in Biochemistry approved by the GAC has not been completed.
8. Two of the Advanced Topics in Physiology Courses.
9. Special Topics in Physiology. Students will complete this course between their second and fourth years. Credit will be given for presenting research in the form of a poster or talk at a local, national or international meeting.

The remaining 48 graded credit hours may be completed by selecting any other graded courses given at USUHS or FAES (Foundation for Advanced Education in the Sciences, Inc., at the NIH) that are recommended and approved by the student's academic advisor and the GAC.

Required Non-Graded Core Courses

1. History of Physiology.
2. Seminar.
3. Research.
4. Ethics and Responsible Conduct of Research.

Research Experience

During the Fall quarter of the first year, all new students in the Department of Physiology will be required to take Scientific Methods and Laboratory Techniques I. This course will serve to introduce the new students to the members of the faculty and their research programs and enable them to choose faculty members for their three research experiences. For each of these research experiences, students will register for Scientific Methods and Laboratory Techniques II. The first of three laboratory experiences will begin during the Winter quarter. The Winter and Spring quarter experiences will last 12 weeks each. The Summer quarter experience will last 6 weeks since students will be spending at least twice as many hours per day in the laboratory. By the end of the Summer quarter of the first year, students will have completed their research experiences and have chosen a research advisor.

Before the completion of each laboratory experience, students will be required to write a research proposal on a topic related to the research interests of the laboratory mentor. The proposal will use a modified USUHS grant proposal format. This exercise will train students to design hypotheses and experiments, and to express their ideas in a grant format. This experience will provide the students with critical practice for their qualifying examination which will use a modified form of PHS 398 (NIH grant application) as the format. The students will receive a grade for 2 qtr hrs for their effort after each research experience. This grade will be determined by the faculty member in whose laboratory the student is working and will be based on attendance (a minimum of 6 hours per week), performance in the laboratory (50%) and the quality of their proposal (50%). If a student begins their program of study with a research mentor identified, rotations in 3 laboratories will not be required. However, the student will still be required to write 3 proposals (on different topics), will be strongly encouraged to carry out at least one research experience in another laboratory and to write one of the required proposals in conjunction with that laboratory experience.

Teaching Requirements

Since experience in teaching is considered an integral part of the Graduate Program, students will be required to participate as teaching assistants in the Medical Physiology laboratories. A student may elect to assist in other courses given at USUHS. Consent of the research advisor will be necessary for participation in any teaching beyond the minimal requirement. Students will receive non-graded credit for their participation each time they teach in a course.

Seminar Requirements

Since organization and presentation of data and speaking skills are essential to every researcher, all students in the Physiology Graduate Program will be required to present yearly seminars and to attend all seminars presented in the Departmental Seminar Series. The topic of the seminar will be selected by the student and their academic or research advisor. The student will receive a 1 qtr hr graded credit for the quarter that they present their seminar. This grade will be given by the Chair of the GAC with input from the student's academic or research advisor.

Interim Evaluation by GAC

Academic advisors will report annually to the GAC. By the end of the first year, students will have chosen a research advisor for their doctoral research. If, at the end of the first year, the student does not have a G.P.A. of 3.0 or better, they will appear before the GAC for evaluation. If the G.P.A. is such that it can not be remediated by the end of the following Spring quarter, the student will be disenrolled.

G.P.A. Requirements and Conditions for Disenrollment

All full time graduate students must complete their 48 graded credit hours with a G.P.A. of 3.0 or better, complete their qualifying examination and advance to candidacy by the end of their second year. A minimum of 24 graded credit hours must be completed by the end of the Spring quarter of the first year. This number of completed credit hours is necessary for the GAC to assess the student's progress and status and to report the status of the student to the University Graduate Education Committee (GEC) at the end of the first year. Every student's G.P.A. must be maintained at 3.0 or better or they will appear before the GAC for consideration of disenrollment.

Qualifying Examination

Before the end of the Spring quarter of the second year, students will take their Qualifying Examination. The examination will consist of the preparation and oral defense of a grant proposal on one of three topics presented to the student. The exact time of the examination will be determined by the student's research advisor and the Graduate Program Director but it must be completed by the end of the second year.

A Qualifying Examination Committee will administer the examination and evaluate the student's performance. The Qualifying Examination Committee will consist of five faculty members from the graduate student's department. The student's research advisor will serve on this committee but will not act as the Chairperson of the Committee. The student and their research advisor will determine the members of the Committee and provide this list of names to the GAC for approval at the beginning of the Winter quarter of the second year. The Chair of the GAC will appoint one of the members of the Committee to act as Chairperson. The Chairperson of the Committee will be responsible for organizing and administering the examination. The Chairperson will convene the Examination Committee once it is formed and the examination schedule has been established.

The Committee will determine three topics to be presented to the student early in the Spring quarter of the second year. These topics will not include the student's topic of research but they may be related to the research topic. There should be no overlap of the three topics. In a subsequent, seven-week period, students must select one of the three topics, research the topic, and write the research proposal. Although the student will be given three weeks to choose and research one of the topics, they will be strongly encouraged to choose their topic by the end of the first week. When the student has chosen their topic, they should inform the Chairperson of the Examination Committee. This time frame provides students with 4-6 weeks to write the grant proposal on the selected topic. Students will develop a research plan that meets the criteria defined in NIH form PHS 398. They will be allowed up to 25 pages to develop their research plan. The research plan will include 3 parts: a) Specific Aims (one page is recommended); b) Background and Significance; and c) Research Design and Methods. The pages normally devoted to the Preliminary Results/Progress Report section should be used for a comprehensive Background and Significance section. Students must include a Literature Cited section but this section is not part of the 25 pages used for the Research Plan. The student's research advisor may not be involved in the preparation of the proposal. The scientific content and organization of the proposal are the responsibility of the candidate. Advice and guidance on the preparation of the proposal will be provided by the Chairperson of the Examination Committee.

On or before the due date, students will distribute copies of the proposal to all members of the Examining Committee. Committee members are expected to evaluate the proposal within one week. Each member of the Committee will determine if the student passed or failed the written part of the examination and inform the Chairperson in writing. If a member of the Examination Committee fails the student on the proposal, they must state in writing the reasons for the failing grade. If the majority of the Examination Committee agrees that the proposal is satisfactory, the student must take the oral part of the examination within two weeks from the date of distribution of the proposal to the Committee.

If a student passes the written portion of the exam on the first attempt, they will have two opportunities to pass the oral portion of the examination. The Director of the GAC or a member of the GAC appointed by the Director will observe the oral examination. After the

oral examination, the student will be asked to leave the room and the members of the Examination Committee will vote on the student's performance. The decision of the Committee will be made by majority vote. The Chairman of the Qualifying Examination Committee will provide the Chair of the GAC with a written report on the examination and the Committee's decision. If the student fails the oral examination, it shall be retaken with the same Examination Committee within a period of two weeks. A student who has failed the oral part of the Qualifying Examination twice will be recommended for dismissal from the program.

If a majority of the Committee members find the written proposal unsatisfactory, the student will be deemed to have failed and given two weeks to rewrite the proposal. The written portion of the exam may be repeated once but in this case the subsequent oral must be passed on the first attempt. If a majority of the Committee members find the rewrite or oral exam unsatisfactory, the student will be deemed to have failed the qualifying examination and dismissed from the graduate program.

Advancement to Candidacy

During the second year, after students have completed 48 graded credit hours with a G.P.A. of 3.0 or better, and passed the qualifying examination, they will be advanced to candidacy. A completed Report of the Advisory Committee must be sent to the Associate Dean of the Graduate School, Office of Graduate Education, before the student is officially advanced to candidacy. After advancement to candidacy, if the student has not already done so, they will: 1) write their research proposal within six months, and 2) form and meet with their research committee.

Research Committee and Thesis Examination Committee

The members of the Research Committee will also serve as the student's Examination Committee for defense of the dissertation. Therefore, when the student chooses the members of their Research Committee, they should follow the rules of the University which govern the makeup of the Examination Committee. The Examination Committee for the Ph.D. degree must be composed of at least four persons with doctoral degrees. At least three of the members of the committee must be graduate faculty members with a rank of Assistant Professor or above and have a primary academic appointment in the student's respective department. A fourth member of the Committee must be from another department at USUHS with no appointment in the primary graduate department. Additional members may serve on the Committee and may either hold a faculty position at USUHS or have a faculty appointment outside of USUHS. All thesis Examination Committee appointments must be approved by the GAC.

Research Proposal

The research proposal will be written using a suitable grant format (PHS, NSF, or other peer-reviewed funding organization) chosen by the student and their research advisor and approved by the GAC. The research proposal must be completed and the first meeting of the Research Committee be convened within 6 months of advancement to candidacy. At the initial meeting the Research Committee will discuss, modify, approve or reject the student's research proposal. A written summary of this initial meeting and its results will be submitted by the Chairperson of the Research Committee to the GAC. The research proposal must be approved by the Research Committee within one year of advancement to candidacy. The members of the Research Committee will meet with the student and their research advisor every 4 to 6 months after the initial meeting.

If it becomes apparent that the research proposal will not be completed within the 6 month time period, the student and their advisor must meet

with the members of the GAC by the end of the fifth month. The student and their advisor should be prepared to discuss the circumstances causing the delay and to submit a revised deadline for completion of the research proposal. The submitted schedule must be approved by the members of the GAC. A student will be allowed to delay completion of their proposal only once. If a student delays completion of their research proposal and does not complete it on schedule, the student and their research advisor will meet with the GAC to consider withholding the student's stipend until the research proposal is complete.

Dissertation

A written dissertation based on original experimental research will be required of all candidates for the Ph.D. degree. The defense of the dissertation will consist of a public seminar followed by an oral examination. The oral examination will be closed to the public and will be conducted by an Examination Committee. The results of this examination with the signatures of the members of the Examination Committee certifying the student's qualifications for the degree will be transmitted to the Associate Dean for Graduate Education. Following review and approval by the Dean of the School of Medicine, the Dean will recommend to the Board of Regents that the Ph.D. degree be awarded.

Faculty

Abbrecht, Peter H., B.S., M.S., Ph.D., M.D.

(Purdue University, 1952; University of Michigan, 1953, 1956, 1962)

Professor and Chairman of Physiology

Professor of Medicine

Bryant, Howard J., B.A., M.S., Ph.D.

(San Diego State College, 1963, 1965; University of Arizona, 1973)

Associate Professor of Physiology

Bunger, Rolf, M.D., Ph.D.

(University of Frieberg, 1964; University of Heidelberg, 1970)

Professor of Physiology

Chakraborty, Pabir K., Ph.D.

(Calcutta University, 1955; Oregon State University, 1969, 1971)

Associate Professor of Physiology

Associate Professor of Obstetrics and Gynecology

Cough, David L., B.S., Ph.D.

(Lynchburg College, 1966; Medical College of Virginia, 1975)

Associate Professor of Physiology

Darling, T.N., B.S., M.D., Ph.D.

Houghton College, 1983; Duke, 1990; Duke 1990)

Assistant Professor

Dobbins, David E., B.S., M.S., Ph.D.

(Michigan State University, 1969, 1972, 1975)

Associate Professor of Physiology

Driscoll, William J., B.S., Ph.D.

(University of New Mexico, 1975, 1987)

Research Assistant Professor

Galdzicki, A., M.Sc., Ph.D.

(University of Wroclaw, Wroclaw, Poland, 1979; Academy of Medicine, Wroclaw, Poland, 1982)

Research Assistant Professor

Goldstein, Robert E., A.B., M.D.

(Harvard University, 1961, 1965)

Professor of Physiology

Professor and Chairman of Medicine

Haddy, Francis J., B.S., M.D., M.S., Ph.D.

(University of Minnesota, 1943, 1946, 1947, 1949, 1953)

Professor Emeritus of Physiology and Medicine

Kinnamon, Kenneth E., B.S., D.V.M., M.S., Ph.D.,

COL, VC, USA (Ret.)

(Oklahoma State University, 1956; Texas A&M University, 1959;

University of Rochester, 1961; University of Tennessee, 1971)

Professor of Physiology, Radiology and Nuclear Medicine, and Preventive
Medicine and Biometrics

Krauthamer, Victor, CDR, USPHS, B.S., M.A., Ph.D.

(City Colleges of New York, 1973; SUNY at Buffalo, 1976, 1980)

Adjunct Assistant Professor

Leonard, Joel, B.S., M.S., Ph.D.

(University of Michigan, 1971)

Visiting Scientist

Lo, Chu-Shek, B.S., M.S., Ph.D.

(National Taiwan University, 1962; University of Notre Dame, 1965;

Indiana University Medical School, 1972)

Associate Professor of Physiology

McCarthy, Elizabeth, R.N., B.S.N., C.R.N.A., Ph.D.

(Uniformed Services University of the Health Sciences, 1985)

Adjunct Assistant Professor

Mueller, Gregory P., B.A., Ph.D.

(University of Montana, 1971; Michigan State University, 1976)

Professor of Physiology

Muldoon, Sheila M., B.S., M.B., M.S., M.D.

(National University of Ireland, 1958, 1963; Mayo

School of Medicine, 1969; University of Minnesota, 1970)

Associate Professor of Physiology, Professor of Anesthesiology

Murano, Genesio, B.A., M.S., Ph.D.

(University of Massachusetts, 1964; Wayne State University, 1966, 1968)

Adjunct Professor of Physiology

Namboodiri, M.A.A., B.Sc., M.Sc., Ph.D.

(Maharaja's College, Cochin, India, 1969; Maharaja's College, Cochin,

India, 1971; Indian Institute of Science, Bangalore, India, 1976)

O'Neill, John T., B.S., Ph.D.

(University of Maryland, 1972; Johns Hopkins University, 1980)

Research Assistant Professor of Physiology and Pediatrics

Pamnani, Motilal B., M.D., M.S., Ph.D.

(Bombay University, 1956; 1963; Michigan State University, 1974)

Professor of Physiology and Medicine

Premen, Andre J., B.S., Ph.D.

(Brown Wallace College, 1978; Uniformed Services University of the Health Sciences, 1983)
Adjunct Assistant Professor

Self, David A., B.A., M.S., Ph.D.

(Western Washington University, 1977; Washington State University, 1986, 1988)
Assistant Professor of Physiology

Shea-Donohue, P. Terez, B.A., Ph.D.

(Wheaton College, 1973; Georgetown University, 1978)
Associate Professor of Physiology and Assistant Professor of Medicine

Schwartz, Lisa M., B.S., Ph.D.

(University of Maryland, 1982; Uniformed Services University, 1986)
Research Assistant Professor of Physiology

Terris, James M., B.S., M.S., Ph.D.

(University of Maine, 1964; Eastern Michigan University, 1970; Michigan State University, 1974)
Associate Professor of Physiology
Director of Graduate Education

Wartofsky, Leonard, B.S., M.S., M.D.

(George Washington University, 1959, 1961, 1964)
Adjunct Professor of Physiology and Medicine

White, Ronald J., B.S., Ph.D.

(University of Southwestern Louisiana, 1963; University of Wisconsin, 1965)
Research Professor of Physiology

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Graduate Degree Program in Preventive Medicine and Biometrics

The Department of Preventive Medicine and Biometrics offers programs of study leading to the degree of Master of Public Health (M.P.H.), Master of Tropical Medicine and Hygiene (M.T.M.&H.), Master of Science in Public Health (M.S.P.H.), Doctor of Philosophy (Ph.D.) in Medical Zoology in the fields of Medical Parasitology & Vector Biology (Medical Entomology and Medical Malacology), and Doctor of Public Health (Dr.P.H.).

The M.P.H. degree program provides a broad didactic experience in preventive medicine and its principal subspecialties, and is primarily designed for individuals planning careers in Preventive Medicine and Community Health within the Uniformed Services. An M.P.H. program is the specific academic requirement for physicians and veterinarians seeking residency training and board certification in General Preventive Medicine, Laboratory Animal Medicine, Public Health, Occupational Medicine, or Aerospace Medicine. Matriculants may include physicians who wish to apply the disciplines of epidemiology and biostatistics in other specialty areas (not necessarily leading to board certification in Preventive Medicine), and others planning military careers in Community Health.

The M.T.M.&H. program provides the same broad didactic experience in the "core" disciplines (epidemiology, biostatistics, health services administration and environmental and occupational health) as the M.P.H. degree program and, in addition, specialized experience at one of several overseas laboratory facilities in the diagnosis, clinical management and field study of diseases endemic in various tropical regions. The M.T.M.&H. degree program is designed for physicians desiring specific preparation for assignment to tropical medicine clinical, research and teaching positions in the Uniformed Services. The M.T.M.&H. degree is also suitable academic preparation for residency training and board certification in General Preventive Medicine.

The M.S.P.H. is a 2-year degree program which is primarily designed for non-physician professionals planning a career in a discipline of preventive medicine and for individuals who desire a more intense, in-depth examination of a specialty track than is possible in the M.P.H. degree plan. Like the M.P.H. program, with which it shares the same core course work, it is a rigorous, quantitatively oriented curriculum. The goal of the M.S.P.H. program is to provide each student with the necessary academic background to function as a specialist in one of the disciplines of preventive medicine.

The Ph.D. degree program provides a broad didactic and research experience in Medical Zoology and its principal subspecialties, and is primarily designed for individuals interested in Medical Parasitology or Vector Biology (Medical Entomology and Medical Malacology). Specific goals for the Ph.D. degree program are to develop independent scholarship, originality, and competence in research, teaching and professional service. This program is designed for outstanding students with a strong commitment to careers in Medical Zoology. Within each Ph.D. program, an individualized course of study is designed for each graduate student to meet his or her specific needs. The Ph.D. program provides the training and experience required for research careers in Medical Parasitology, Medical Entomology and Medical Malacology, and matriculants must have a Master's degree or its equivalent in an

appropriate field of biology. Only under the most exceptional circumstances will individuals with only a baccalaureate degree be considered for admission to the program.

The Dr.P.H. degree program is designed to provide rigorous training for advanced students who plan to take leadership roles in research, teaching or policy development. The students are trained in a broad array of research techniques, with an emphasis on epidemiology and biostatistics, and they have opportunities to apply this knowledge in the conduct of their independent research projects. They are given broad exposure to major health policy issues confronting the U.S., both in formal courses and in seminars. They learn to evaluate data and ideas using a critical, flexible and creative approach, characterized by intellectual and methodological precision.

Admission Requirements

Most applicants are accepted as full-time students and must devote their full-time effort to the graduate training program. In addition to the USUHS graduate training application form, the University requires complete academic transcripts of all post-secondary education, results of the Graduate Record Examination (GRE), three letters of reference from individuals familiar with the academic, professional or military work of the applicant, and a personal statement expressing the applicant's career objectives. The GRE may be waived for those who completed a graduate degree from an accredited college or university within the last 3-5 years. Applicants who wish to have the GRE requirement waived must make a formal, written request to the Associate Dean for Graduate Education. The completed application form and supporting documents must be submitted to the Associate Dean for Graduate Education, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, Maryland 20814-4799. Students will be selected by Departmental Admission Committees. Active duty Uniformed Services personnel must obtain the sponsorship of their parent organization and may incur an obligation for additional service in accordance with the applicable regulations governing sponsored graduate education. Civilians will incur no obligation. Official notification of acceptance will be made only by the Office of Graduate Education.

M.P.H. Program

Applicants for the M.P.H. program must have completed the minimum of a baccalaureate degree prior to matriculation at USUHS, including college-level courses in mathematics, biology, physics, and inorganic and organic chemistry, or equivalent college-level courses. A course in calculus, while not a prerequisite, is considered desirable. Preference will be given to medical, dental, and veterinary officers on active duty in the Uniformed Services who have completed at least one year of postdoctoral clinical training, and to other Uniformed Services officers possessing doctoral degrees in health-related fields. Applicants without doctoral degrees in one of the health-related fields may also be considered for admission; however, prerequisites in the case of such applicants will include outstanding academic achievement, as evidenced by grades in the undergraduate program and scores on the GRE, and a demonstrated interest in pursuing a career in Community Health. Civilian applicants will be considered on a space-available basis. Civilians accepted as graduate students in a Masters level program are not authorized a stipend. No tuition fees will be charged civilians accepted as students in the M.P.H. program.

A limited number of Commissioned Officers in the Uniformed Services may be admitted into the M.P.H. degree program with their billet remaining at their parent agency. These students will have two years to complete

all course requirements. In order to be enrolled as a two-year student, the officer must furnish a letter from the appropriate supervisory level approving the officer's participation and agreeing to his other commitment to USUHS for the degree program. The non-billeted program is open only to Commissioned Officers and U.S. government civilian employees.

M.T.M.&H. Program

Applicants for the M.T.M.&H. degree must have completed an M.D. or D.O. program and at least one year of post-doctoral clinical training. Applicants or their sponsoring institutions will be responsible for all travel costs associated with the overseas portion of this program.

M.S.P.H. Program

Applicants for the M.S.P.H. program must have completed the minimum of a baccalaureate arts, science or engineering degree at an accredited university. Preference for admission will be given to mid-career active duty officers who will continue in a military Public Health related career.

Ph.D. Program

Applicants for admission to the Ph.D. program should have a masters degree or the equivalent in a field of biology. Course work or experience in medical parasitology or vector biology (medical entomology or malacology) is desirable. Preference for admission will be given to bioscience (entomologists, parasitologists, etc.) officers on active duty in the Uniformed Services, and to other Uniformed Services officers possessing doctoral degrees in health-related fields. Applicants with less than a masters degree may also be considered for admission; however, prerequisites in the case of such applicants will include the minimum of a baccalaureate degree, an outstanding academic record, as evidenced by grades in the undergraduate program, scores on the GRE, and rigorous course work in biology. Civilian applicants will be considered on a space-available basis, with preference given to health professionals sponsored by other government agencies.

Dr.P.H. Program

Preference for admission will be given to medical, dental and veterinary officers on active duty in the Uniformed Services, and to other Uniformed Services officers possessing doctoral degrees in health-related fields. Applicants with less than a doctoral degree in one of the health-related fields may also be considered for admission; however, prerequisites in the case of such applicants will include the minimum of a baccalaureate degree, an outstanding academic record, some public health experience, and a demonstrated interest in pursuing a career in Public Health. These students are required to take additional course work to strengthen their knowledge of disease transmission and pathophysiology. Civilian applicants will be considered on a space available basis, with preference given to physicians and other health professionals sponsored by government agencies.

The Graduate Affairs Committee, Advisors, and Advisory Committees

A departmental Graduate Affairs Committee and Subcommittees, consisting of faculty members at the rank of assistant professor or above will be appointed annually by the Department Chair. The departmental Graduate Affairs Committee and Subcommittees serve in an advisory capacity and may consider all policy matters with respect to the departmental Graduate Programs, including but not limited to the development of curriculum, the selection of students, designation of student advisors,

supervision of student course programs, and monitoring of the academic standing of graduate students. Recommendations will be presented to the Department Chair.

Each master degree student will choose or be assigned an advisor who is a member of the departmental faculty. The advisor is responsible for assisting the student in the selection of an appropriate curriculum of study based on his or her career plans and objectives, for monitoring student performance, and for counseling as appropriate.

For each Ph.D. and Dr.P.H. student, a Permanent Advisory Committee will be selected by the Director of Graduate Programs, with input from the student, within his or her first two years of study. It will consist of at least three members of the faculty (a chairperson and two others) to oversee and direct the program. When formed, the advisory committee, in concert with the student will prepare a program of study listing all degree requirements and submit it for approval to the Chairperson and Associate Dean for Graduate Education through the Director of Graduate Programs. Any changes by the Associate Dean or Chairperson will be made in consultation with the student and Advisory Committee. This Advisory Committee Report, as changed or amended in full consultation between the student and the committee, will be regarded as the statement of program requirements.

It is anticipated that the qualifying examination, for those who matriculated with a masters degree, will be given one year post-admission and not later than 24 months post-admission. The Qualifying Examination Committee for Ph.D. degree candidates will be composed of at least four graduate faculty members at the rank of Assistant Professor or above. Three members will be from the Department of Preventive Medicine and Biometrics. The fourth member may hold either a faculty position in this department, in another department at USUHS or have an appointment outside of USUHS. Additional members, if desired, may either hold a faculty position at USUHS or have an appointment outside of USUHS. The majority of the Committee will be full-time faculty members of the Department of Preventive Medicine and Biometrics. The Committee will be appointed by the Director of the Graduate Program.

The Dissertation Examination Committee will be composed of at least four persons with doctoral degrees. At least three of these must be graduate faculty members at the rank of Assistant Professor or above with a primary appointment in the Department of Preventive Medicine and Biometrics. A fourth member of this Committee will be from another department at USUHS with no secondary appointment in Preventive Medicine and Biometrics. Additional members may either hold a faculty position at USUHS or have an appointment outside of USUHS. Outside appointments will be recommended by the Director of Graduate Programs and approved by the Chairperson. The majority of the Committee must be full-time faculty of the Department of Preventive Medicine and Biometrics.

Course Requirements

Masters Programs

The M.P.H. and M.T.M.&H. programs each consist of a minimum of 60 credit hours. Of the 60 credit hours, at least 39 hours must be earned by taking required courses in the Department of Preventive Medicine and Biometrics in the basic core subjects of epidemiology, biostatistics, health services administration, environmental and occupational health, and behavioral science. Exemption of up to eight credit hours of required work may be granted by the departmental Graduate Affairs Committee for: 1) equivalent course credits earned from another accredited graduate or medical school, or 2) by student demonstration of

proficiency in the subject area. Elective course work may be substituted for the exempted required hours. Each student designates a track from one of the core subject areas and will focus elective credits in that area. A thesis is not a course requirement for these two programs.

Each M.P.H. student must complete an Independent Project under the supervision of a member of the faculty. This project is intended to demonstrate the student's ability to apply didactic classroom experience to real public health problems in a practical manner and to integrate his or her knowledge of the core academic subjects.

The minimum residence requirement is normally 12 months of full-time study. In the M.T.M.&H. program, the third or fourth quarter will be spent in an affiliated overseas laboratory to furnish experience in the diagnosis, clinical management and field study of tropical diseases.

The M.S.P.H. is a 2-year program. Students take the 39 required core courses of the MPH program, a minimum of 16 hours of directed research for their thesis work, 4 credits of directed rotation, and an additional 50 credits of track specific and elective course work. Features of the MSPH degree are: students are afforded an intensive and in-depth opportunity for course work in a specialty track offered in the second year of the program; directed rotations provide an opportunity for field training and study at a variety of federal and DoD facilities; a thesis based on independent research and study is prepared and orally defended; and students participate in 5 quarters of a journal club.

Students may choose from four tracks within the MSPH: environmental health sciences, industrial hygiene, health physics, and medical entomology. Students will be expected to major in one track and also take elective credits from at least one of the other tracks. Upon completion of the main track, students will be able to demonstrate an in-depth understanding of the science and practice of one emphasis area, and a basic understanding of one of the other areas.

For environmental health sciences, studies will cover toxicology, geographic information systems, environmental health risk assessment, regulations and policy, preventive medicine in joint operations, humanitarian assistance, deployment environmental exposure, water and wastewater treatment processes, and solid and hazardous wastes.

For industrial hygiene, the students will gain the knowledge and skills necessary to function as an Industrial Hygienist, to include: ventilation, ergonomics, safety, radiation, toxicology, noise, regulations, chemical hazards, laboratory quantitative and qualitative analytical methodologies, and principles of hazard control.

For health physics, the students will gain the knowledge and skills necessary to function as a Health Physicist, to include ionizing and non-ionizing radiation dosimetry, biological effects of radiation, industrial hygiene, ventilation, toxicology, regulations, laboratory analytical methodologies and principles of medical physics. Upon completion of the curriculum, the student should be well prepared to pass the American Board of Health Physics requirements.

For medical entomology, the students will gain a knowledge and understanding of vector biology and of how arthropods affect human health; how to conduct vector-borne disease risk assessments; and how to plan, coordinate and implement vector control operations.

Doctoral Programs

The Ph.D. program offers a track of study in Vector Biology (Medical Entomology or Medical Malacology). All students will be expected to

complete a minimum of 144 credit hours, of which 48 credit hours must be devoted to formal course work. A series of core courses will be required of all students in the program. Credit for teaching is obtained by serving as a teaching assistant in the exempted course. Teaching experience is considered to be an integral part of a graduate education and all graduate students in the program will participate in the Diagnostic Parasitology course offered to USUHS medical students and in other Department courses.

A written dissertation based on the student's original research must be prepared by the student, submitted for approval to the advisory committee, and must be presented and defended before a Dissertation Committee.

The Dr.P.H. program requires at least 3 years of full-time study and students will be expected to complete a minimum of 144 credit hours, 48 of which must be devoted to formal course work. The entire program of study will consist of the following components: the basic academic course work (the current M.P.H. program), additional advanced electives, the "Foundations" seminar series and journal clubs, work as a teaching assistant, and a dissertation. A candidate already possessing an M.P.H. degree may be considered for advanced placement in the program. Students transferring into the Dr.P.H. program from other institutions may transfer academic credit to meet the M.P.H. and Dr.P.H. requirements, with the approval of the Director of Graduate Programs. Full credit will be given for all formal, graded courses taken in the USU MPH Program.

Student Performance

Student performance in all formal courses taken for credit, whether at USUHS or one of the affiliated overseas laboratory facilities, will be evaluated and graded using letter grades or credit/no credit, as set forth in USUHS basic instructions. Dr.P.H. students must earn at least a "B" in each required course. The student must have a "B" or better grade point average at the end of the academic year to be eligible for the degree. Students will be referred immediately to the Graduate Education Committee when a final grade of "D" or "F" is received in any course and if their GPA is less than 3.0 at the end of Winter Quarter or thereafter. The Graduate Education Committee, with advice from the faculty of the Department of Preventive Medicine and Biometrics, will forward appropriate recommendations for remedial action or dismissal.

Awarding of the Degree

Upon successful completion of all requirements the candidate will be recommended by the Department's Graduate Affairs Committee to the Department Chair who will certify the student's qualifications for the degree to the Associate Dean for Graduate Education. Following review and approval by the Dean of the School of Medicine, the Dean will recommend to the Board of Regents that the Ph.D., Dr.P.H., M.P.H., M.T.M.&H or M.S.P.H. be awarded.

Faculty

Laughlin, Larry W., M.D., M.Sc., Ph.D., CAPT, MC, USN

(St. Louis University School of Medicine, 1971; London School of Hygiene and Tropical Medicine, 1979, 1981)

Professor and Chair, Department of Preventive Medicine and Biometrics

Andre, Richard G., M.Sc., Ph.D.

(North Carolina State University, 1974; Iowa State University, 1981)

Professor (Tropical Public Health)

Brehm, Bruce B., D.M.D., M.P.H., LTC, USA, DC

(University of Kentucky College of Dentistry, 1982; University of North Carolina, Chapel Hill, 1997)

Assistant Professor (Center for Oral Health Studies)

Bryan, Joe Paul, M.S., M.D., CDR, MC, USN

(Oklahoma Christian College, 1974; University of Oklahoma, 1979)

Associate Professor (Tropical Public Health)

Carney, W. Patrick, Ph.D., M.P.H.

(University of Montana, 1967; Johns Hopkins School of Public Health, 1976)

Professor (Tropical Public Health) and Chief of Staff

Chan, Wing T., Ph.D., S.M.

(McGill University, 1969; Harvard University, 1975)

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(University of the Health Sciences College of Osteopathic Medicine, 1974; University of Texas School of Public Health at Houston, 1983)

Assistant Professor and Division Director (Aerospace Medicine)

Cole, Marlene N., D.V.M., M.P.H., CAPT, VC, USPHS

(Guelph University, Canada, 1977)

Assistant Professor and Director of Veterinary Education and Research

Cross, John H., B.A., M.A., Ph.D.

(Miami University, 1953, 1955; University of Texas, 1958)

Professor (Tropical Public Health)

Cruess, David F., B.S., Ph.D.

(Southern Connecticut State College, 1973; Johns Hopkins University, 1978)

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(University of Virginia, 1970, 1974; The Johns Hopkins University School of Hygiene and Public Health, 1984)

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(The Ohio State University, 1976; Colorado State University, 1993)

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(West Virginia University, 1980; Ohio State University School of Hygiene and Public Health, 1989)

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(Israel Institute of Technology, 1968; Cornell University, 1970, 1971)

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Graduate Course Offerings in the Basic Medical Sciences

The following biomedical science courses are regular course offerings in the School of Medicine (the numbers in parentheses are School of Medicine course numbers) and are required courses for certain programs of graduate study.

Course	Qtr Credit Hours	Quarter
Module I Anatomy & Physiology		
Ia. (ATO510) Intro to Structure & Function	3	Fall
Ib. (ATO511) Gross Anatomy: Back, Upper Extremity & Thorax	3	Fall
Ic. (ATO512) Gross Anatomy: Abdomen Pelvis, Perineum & Low Ext	4	Winter
Head & Neck & CNS Anatomy, (ATO1012)	9	Winter
Organ System Microanatomy, (ATO1013)	4	Spring
Biochemistry, (BCO1001)	9	F-5, W-4
Pathology, (PAO2001)	16	F-6, W-6, Sp-4
Pharmacology, (PHO2001)	9	W-4, Sp-5
Clinical Pharmacology, (PHO20013)	2	Spring
Physiology II, (PYO1001)	8	W-1, Sp-7
Medical Psychology, (MPO1001)	2	Sp-1, Su-1
Epi & Biometrics, (PMO1001)	3	W-1, Sp-1, Su-1
Parasitology & Med Zoo, (PMO1002)	2	W-1, Sp-1
Medical Microbiology, (MCO2001)	10	F-7, W-3
Clinical Concepts (IDO2001)	7	F-2, W-2, Sp-3

In addition to the courses listed in this bulletin, special courses may be developed based on student need.

Graduate Courses

Anatomy

- ATO505. Scientific Method and Laboratory Techniques I (4 Qtr hrs)
- ATO506. Scientific Methods and Laboratory Techniques II (6 Qtr hrs)
- ATO510. Anatomy and Physiology 1a: Introduction to Structure and Function (3 qtr hrs)
- ATO511. Anatomy and Physiology 1b: Gross Anatomy-Back, Upper Extremity and Thorax (3 Qtr hrs)
- ATO512. Anatomy and Physiology 1c: Gross Anatomy-Abdomen, Pelvis, Perineum and Lower Extremity (4 Qtr hrs)
- ATO601. Seminar in Anatomy (1 Qtr hr)
- ATO701. Tutorial in Anatomy (Variable Qtr hrs)
- ATO901. Research in Anatomy (Variable Qtr hrs)

NOTE: See Interdisciplinary, Molecular and Cell Biology and Neuroscience Courses also.

Biochemistry

- BCO504. Enzymology (4 Qtr hrs)
- BCO505. Membrane Biochemistry (4 Qtr hrs)
- BCO506. Physical Biochemistry of Macromolecules (4 Qtr hrs)

BC0520. **Advanced Biochemistry I** (3 Qtr hrs)
BC0521. **Advanced Biochemistry II** (3 Qtr hrs)
BC0601. **Seminar in Biochemistry** (1 Qtr hr)
BC0701. **Tutorial in Biochemistry** (Variable Qtr hrs)
BC0801. **Special Topics in Biochemistry** (Variable Qtr hrs)
BC0901. **Research in Biochemistry** (Variable Qtr hrs)

NOTE: See Interdisciplinary and Molecular and Cell Biology Courses also.

Emerging Infectious Disease

EID501. **Models of Emerging Infectious Disease-I** (2 Qtr hrs)
EID502. **Models of Emerging Infectious Disease-II** (2 Qtr hrs)
EID503. **Models of Emerging Infectious Disease-III** (2 Qtr hrs)
EID504. **Models of Emerging Infectious Disease-IV** (2 Qtr hrs)
EID505. **Fundamentals of Infectious Disease Pathology and Laboratory
Diagnosis**(4 Qtr hrs)
EID510. **Emerging Infectious Disease (EID) Journal Club**(1 Qtr hrs)
EID601. **Emerging Infectious Disease (EID) Seminar** (2 Qtr hrs)

Medical Psychology

MP0301. **Military Psychology I: Organizational and Industrial** (3 Qtr hrs)
MP0302. **Military Psychology II: Clinical Applications** (3 Qtr hrs)
MP0401. **Clerkship I** (7 Qtr hrs)
MP0402. **Clerkship II** (7 Qtr hrs)
MP0403. **Clerkship III** (7 Qtr hrs)
MP0404. **Practicum** (3 Qtr hrs)
MP0405. **Internship** (12 Qtr hrs)
MP0410. **Clinical Skills Training Seminar I** (2 Qtr hrs)
MP0411. **Clinical Skills Training Seminar II** (2 Qtr hrs)
MP0501. **Introduction to Medical Psychology** (3 Qtr hrs)
MP0502. **Psychophysiology I** (3 Qtr hrs)
MP0505. **Social Psychology** (3 Qtr hrs)
MP0506. **Personality & Health** (3 Qtr hrs)
MP0509. **Appetitive Behaviors** (3 Qtr hrs)
MP0510. **Stress** (3 Qtr hrs)
MP0511. **Psychopharmacology** (3 Qtr hrs)
MP0513. **Physiological Bases of Behavior** (7 Qtr hrs)
MP0514. **Psychology of Learning** (3 Qtr hrs)
MP0515. **Behavioral Factors in Chronic Diseases** (3 Qtr hrs)
MP0517. **Human Factors** (3 Qtr hrs)
MP0518. **Applied Multiple Regression Analysis in Psychology** (3 Qtr hrs)
MP0519. **History and Systems in Psychology** (3 Qtr hrs)
MP0521. **Behavioral Pharmacology** (3 Qtr hrs)
MP0525. **Behavior Genetics** (2 Qtr hrs)
MP0526. **Adult Psychopathology** (4 Qtr hrs)
MP0527. **Ethics in Psychology** (3 Qtr hrs)
MP0528. **Theoretical Foundations of Intervention** (3 Qtr hrs)
MP0529. **Foundations of Intervention: Cognitive-Behavioral** (3 Qtr hrs)
MP0530. **Foundations of Intervention: Group Psychotherapy** (3 Qtr hrs)
MP0531. **Medical Psychology: Interventions** (3 Qtr hrs)
MP0532. **Human Development** (3 Qtr hrs)
MP0533. **Neuropsychology** (3 Qtr hrs)
MP0534. **Planning, Implementing and Evaluating Human Services Programs** (3
Qtr hrs)

MPO535. Prevention & Treatment of Substance Abuse/Addiction (3 Qtr hrs)
 MPO536. Cultural Diversity: Research and Practice (3 Qtr hrs)
 MPO537. Clinical Assessment: I (3 Qtr hrs)
 MPO538. Clinical Assessment: II (5 Qtr hrs)
 MPO539. Cognitive Psychology (3 Qtr hrs)
 MPO540. Child Psychopathology & Assessment (3 Qtr hrs)
 MPO542. Advanced Training in Cognitive Behavioral Treatment Interventions (3 Qtr hrs)
 MPO543. Foundation of Intervention: Marital & Couple Therapy (3 Qtr hrs)
 MPO601. Medical Psychology Seminar (1 Qtr hr)
 MPO602. Introductory Seminar for Medical Psychology (3 Qtr hrs)
 MPO701. Tutorial in Medical Psychology (2 Qtr hrs)
 MPO702. Neuropsychological Testing Tutorial (12 Qtr hrs)
 MPO801. Special Topics in Medical and Clinical Psychology (3 Qtr hrs)
 MPO802. Selected Topics in Environmental Psychology (3 Qtr hrs)
 MPO803. Selected Topics in Psychopharmacology (5 Qtr hrs)
 MPO804. Selected Topics in Social Psychology (3 Qtr hrs)
 MPO901. Research Methods & Complex Human Experimentation I (3 Qtr hrs)
 MPO902. Research Methods & Complex Human Experimentation II (3 Qtr hrs)
 MPO903. Research in Medical Psychology (Variable Qtr hrs)
 MPO904. Computer Assisted Data Analysis for Psychological Research (3 Qtr hrs)
 MPO999. Dissertation Research (Variable Qtr hrs)

Microbiology and Immunology

MCO501. Animal Virology (4 Qtr hrs)
 MCO502. Pathogenic Mechanisms (4 Qtr hrs)
 MCO503. Cellular & Molecular Immunology (4 Qtr hrs)
 MCO504. Fundamentals of Immunology (2 Qtr hrs)
 MCO505. Fundamentals of Bacterial Genetics and Physiology (2 Qtr hrs)
 MCO506. Prokaryotic and Eukaryotic Cell Biology and Genetics (4 Qtr hrs)
 MCO508. Fundamentals in Pathogenic Bacteriology (2 Qtr hrs)
 MCO509. Fundamentals of Virology (2 Qtr hrs)
 MCO510. Fundamentals of Parasitology and Mycology (1 Qtr hr)
 MCO601. Frontiers in Microbiology (1 Qtr hr)
 MCO701. Tutorial in Microbiology (2-4 Qtr hrs)
 MCO801. Topics in Microbiology (1 Qtr hr)
 MCO901. Research in Microbiology (Variable Qtr hrs)

Military Medical History

MMH501. Development of Modern Medical Science I (2 Qtr hrs)
 MMH502. Development of Modern Medical Science II (2 Qtr hrs)
 MMH503. Development of Modern Medical Science III (2 Qtr hrs)
 MMH504. Social History of American Medicine I (2 Qtr hrs)
 MMH505. Social History of American Medicine II (2 Qtr hrs)
 MMH506. Development of Medical Care System in the American Army I (2 Qtr hrs)
 MMH507. Development of Medical Care System in the American Army II (2 Qtr hrs)
 MMH508. Development of Medical Care System in the American Army III (2 Qtr hrs)
 MMH601. Tutorials in Military Medical History (1 Qtr hr)
 MMH801. Readings on Military Medical History (1 Qtr hr)
 MMH802. Analytical Methods in Military Medical History (1 Qtr hr)

MMH803. Teaching Methods in Medical History I (1 Qtr hr)
MMH804. Teaching Methods in Medical History II (1 Qtr hr)
MMH901. Research Methods in Military Medical History (2 Qtr hrs)
MMH902. Independent Research in Military Medical History (Var Qtr hrs)

Molecular and Cell Biology

MCB501. Introduction to Computers (2 Qtr hrs)
MCB502. Molecular and Cell Biology Journal Club (1 Qtr hr)
MCB503. Genetics (4 Qtr hrs)
MCB507. Cell Biology I (4 Qtr hrs)
MCB508. Cell Biology II (5 Qtr hrs)
MCB601. Seminars in Molecular and Cell Biology (1 Qtr hr)
MCB701. Tutorial in Molecular & Cell Biology (1-4 Qtr hrs)
MCB801. Techniques Used in Cellular and Molecular Biology (4 Qtr hrs)
MCB901. Introduction to Research in Molecular and Cell Biology (Variable Qtr hrs)

Neuroscience

NSO506. Introduction to Neuroscience (4 Qtr hrs)
NSO507. Biological Basis of Disorders of the Nervous System (3 Qtr hrs)
NSO601. Neuroscience Seminar (1 Qtr hr)
NSO701. Neuroscience Tutorial (1 Qtr hr)
NSO801. Special Topics in Neuroscience (Variable Qtr hrs)
NSO802. Advanced Topics and Techniques in Neuroscience (3 Qtr hrs)
NSO901. Neuroscience Research (1-12 Qtr hrs)

Pathology

PAO501. Topics in General Pathology (Variable Qtr hrs)
PAO502. Topics in Pathogenesis (3 Qtr hrs)
PAO503. Interferons (3 Qtr hrs)
PAO506. Pathology of Organ Systems (1-9 Qtr hrs)
PAO510. Mechanisms of Growth Control in Neoplasia (4 Qtr hrs)
PAO520. Histology for Pathologists (2 Qtr hrs)
PAO530. Medical Laboratory Diagnosis and Pathology of Biological Threat Agents (2 Qtr hrs)
PAO531. Critical Models of Infectious Disease; Pathobiology and Laboratory Diagnosis (4 Qtr hrs)
PAO601. Seminars in Pathology (1 Qtr hr)
PAO701. Tutorial in Molecular Pathobiology (1-4 Qtr hrs)
PAO801. Special Topics in Pathology (2 Qtr hrs)
PAO901. Research in Molecular Pathobiology (1-12 Qtr hrs)
PAO902. Research in Comparative Pathology (1-12 Qtr hrs)

Pharmacology

PHO503. Introduction to Instrumental Methods (4 Qtr hrs)
PHO510. Neuropharmacology (4 Qtr hrs)
PHO601. Pharmacology Seminar (1 Qtr hr)
PHO801. Special Topics in Pharmacology (Variable Qtr hrs)
PHO901. Pharmacology Research (Variable Qtr hrs)

Physiology

PYO001. Teaching Experience in Physiology (1-3 Qtr hrs)
PYO501. Advanced Cardiovascular Physiology (3 Qtr hrs)
PYO502. Advanced Endocrinology (3 Qtr hrs)
PYO503. Experimental Hematology (3 Qtr hrs)
PYO504. Experimental Neurophysiology (3 Qtr hrs)
PYO505. Gastro-Intestinal Physiology (2 Qtr hrs)
PYO506. Principles of Membrane Transport (3 Qtr hrs)
PYO507. Renal and Electrolyte Disorders (3 Qtr hrs)
PYO508. Sensory Neurophysiology (3 Qtr hrs)
PYO509. Cell Physiology (3 Qtr hrs)
PYO510. Environmental Physiology (4 Qtr hrs)
PYO511. Respiratory Physiology (2 Qtr hrs)
PYO512. Advanced Mammalian Reproduction (3 Qtr hrs)
PYO513. History of Physiology (2 Qtr hrs)
PYO514. Introduction to Neurophysiology (3 Qtr hrs)
PYO515. Graduate Medical Physiology (3 Qtr hrs)
PYO601. Physiology Seminar (1 Qtr hr)
PYO801. Special Topics in Physiology (Variable Qtr hrs)
PYO901. Dissertation Research (Variable Qtr hrs)
PYO902. Research in Molecular and Cellular Cardiology (3-4 Qtr hrs)

Preventive Medicine & Biometrics

PMO501. Microcomputer Applications (2 Qtr hrs)
PMO502. Introduction to SPSS (1 Qtr hr)
PMO503. Biostatistics I (4 Qtr hrs)
PMO504. Biostatistics II (4 Qtr hrs)
PMO505. Microcomputer Fundamentals (3 Qtr hrs)
PMO506. Statistical Computing (3 Qtr hrs)
PMO508. Biostatistics III (5 Qtr hrs)
PMO509. Logistic Regression (3 Qtr hrs)
PMO510. Microcomputer Applications in Tropical Medicine and Epidemiology (1 Qtr hr)
PMO511. Introduction to Epidemiology I (4 Qtr hrs)
PMO512. Introduction to Epidemiology II (4 Qtr hrs)
PMO513. Advanced Epidemiologic Methods (4 Qtr hrs)
PMO514. Epidemiology and Control of Infectious Diseases (3 Qtr hrs)
PMO515. Epidemiology and Control of Non-Infectious Diseases (2 Qtr hrs)
PMO516. Design and Analysis of Follow-Up Studies (3 Qtr hrs)
PMO517. Design and Analysis of Case-Control Studies (3 Qtr hrs)
PMO518. Social Epidemiology (3 Qtr hrs)
PMO519. Occupational and Environmental Epidemiology (2 Qtr hrs)
PMO520. Molecular Epidemiology (2 Qtr hrs)
PMO521. Concepts in Molecular Biology and Immunology (2 Qtr hrs)
PMO526. Health Services Organization (3 Qtr hrs)
PMO527. Health Services and Resources Management (3 Qtr hrs)
PMO528. International Health (4 Qtr hrs)
PMO529. Financial Management (2 Qtr hrs)
PMO530. Behavioral and Social Sciences Applied to Public Health (4 Qtr hrs)
PMO531. Health Promotion (3 Qtr hrs)
PMO532. Quality Assessment/Management in Health Care (3 Qtr hrs)
PMO533. Decision Making in Health Care (2 Qtr hrs)
PMO535. The Law of Health Care (3 Qtr hrs)
PMO536. Topics in Maternal and Child Health Care Policy (1-3 Qtr hrs)

PMO537. Clinical Decision Making (1 Qtr hr)
PMO540. Environmental Health (4 Qtr hrs)
PMO541. Global Environmental Health (2 Qtr hrs)
PMO542. Occupational Disease (3 Qtr hrs)
PMO543. Introduction to Occupational Health (1 Qtr hr)
PMO544. Occupational and Environmental Health Programs (3 Qtr hrs)
PMO545. Fundamentals of Industrial Hygiene (3 Qtr hrs)
PMO546. Selected Topics in Environmental/Occupational Health (1-2 Qtr hrs)
PMO547. Clinical Occupational Medicine (1-2 Qtr hrs)
PMO548. Joint Medical Operations and Humanitarian Assistance (1-5 Qtr hrs)
PMO549. Essentials of Toxicology (4 Qtr hrs)
PMO550. Industrial Hygiene I and Laboratory (4 Qtr hrs)
PMO552. Industrial Hygiene II and Laboratory (4 Qtr hrs)
PMO553. Industrial Hygiene Field Studies (2 Qtr hr)
PMO554. Medical Effects of Ionizing and Non-Ionizing Radiation (3 Qtr hrs)
PMO555. Industrial Ventilation (3 Qtr hrs)
PMO556. Industrial Ventilation Laboratory (1 Qtr hrs)
PMO560. Principles and Practice of Tropical Medicine (4-6 Qtr hrs)
PMO561. Medical Parasitology (2 Qtr hrs)
PMO562. Selected Diseases of the Tropics (4 Qtr hrs)
PMO563. Clinical Tropical Medicine (1-12 Qtr hrs)
PMO564. Epidemiology and Control of Arboviruses (2-4 Qtr hrs)
PMO565. Vector Biology (2 Qtr hrs)
PMO566. Physiological Parameters of Vector Competence (4 Qtr hrs)
PMO567. Changing Patterns of Arthropod-Borne Diseases (4 Qtr hrs)
PMO568. Medical Acarology (4 Qtr hrs)
PMO569. Malaria Epidemiology and Control (3 Qtr hrs)
PMO570. Modern Technology and Vector-Borne Disease (4 Qtr hrs)
PMO571. Biosystematics in Medical Zoology (2 Qtr hrs)
PMO572. Introduction to Medical Malacology (3 Qtr hrs)
PMO573. Epidemiology and Prevention of Vaccine-Preventable Diseases (1-2 Qtr hr)
PMO574. Remote Sensing and GIS Methods in Public Health (4 Qtr hrs)
PMO581. Radiation Protection and Personnel Dosimetry (3 Qtr hrs)
PMO582. Radiation Biology (2 Qtr hrs)
PMO583. Substance Abuse (3 Qtr hrs)
PMO586. Technical Writing (1 Qtr hrs)
PMO601. Environmental Health Risk Assessment (3 Qtr hrs)
PMO602. Solid and Hazardous Wastes (3 Qtr hrs)
PMO603. Deployment Environmental Exposures (5 Qtr hrs)
PMO604. Fundamentals of Hydrology and Water and Wastewater Treatment Plant Design (5 Qtr hrs)
PMO605. Analytical Instrumentation Methodologies in Environmental Health (3 Qtr hrs)
PMO606. Non-ionizing Radiation (3 Qtr hrs)
PMO611. Classic Studies in Epidemiology (2-3 Qtr hrs)
PMO612. Clinical Medicine in the Tropics (3-5 Qtr hrs)
PMO613. Health and Medical Care in the Tropics (4 Qtr hrs)
PMO614. Tropical Medicine Rounds (2 Qtr hrs)
PMO615. Sand Flies and Diseases (3 Qtr hrs)
PMO620. Laboratory Animal Preventive and Clinical Medicine (2 Qtr hrs)
PMO621. Large Animals in Research (2 Qtr hrs)
PMO622. Rodents in Research (2 Qtr hrs)
PMO623. Unusual Species in Research (2 Qtr hrs)
PMO624. Research Biomethodology (2 Qtr hrs)
PMO525. Animal Care and Use Program Administration (2 Qtr hrs)

PMO626. Care and Use of Old World Primates in Biomedical Research (2 Qtr hrs)

PMO627. Introduction to Diagnostic Pathology in Laboratory Medicine and Research (2 Qtr hrs)

PMO628. Care and Use of New World Primates in Biomedical Research (2 Qtr hrs)

PMO629. Laboratory Animal Surgery (2 Qtr hrs)

PMO630. Environmental Health Policy (3 Qtr hrs)

PMO631. Environmental and Occupational Health Case Studies (3 Qtr hrs)

PMO632. Management Factors Affecting Research Results (2 Qtr hrs)

PMO633. Rabbits and other Model Systems in Biomedical Research (2 Qtr hrs)

PMO640. Environmental/Occupational Health Seminar (2 Qtr hrs)

PMO641. Occupational and Environmental Health Program Management Seminar (1 Qtr hr)

PMO661. Medical Zoology Seminar (1 Qtr hr)

PMO680. Introduction to Public Health (1 Qtr hr)

PMO681. Current Problems and Practice of Preventive Medicine Seminar (1-2 Qtr hrs)

PMO682. History of Preventive Medicine (2-4 Qtr hrs)

PMO683. Critical Reading Seminar (2 Qtr hrs)

PMO684. Clinical Research Seminar (1 Qtr hr)

PMO685. Health Policy Seminar (1 Qtr hr)

PMO688. Information Gathering in Clinical Medicine (2-12 Qtr hrs)

PMO690. Educational Methods (2 Qtr hrs)

PMO691. Teaching Practicum (3 Qtr hrs)

PMO701. Advanced Biometrics Tutorial (1-12 Qtr hrs)

PMO760. Tropical Medicine Research Tutorial (1-12 Qtr hrs)

PMO761. Immunoparasitology Tutorial (3 Qtr hrs)

PMO763. Tutorial in Medical Zoology (1-12 Qtr hrs)

PMO764. Tutorial in Aquatic Biology (4 Qtr hrs)

PMO801. Selected Topics in Laboratory Animal Science (1-3 Qtr hrs)

PMO802. Laboratory Animal Science Directed Studies (1-12 Qtr hrs)

PMO811. Independent Study in Epidemiology (1-12 Qtr hrs)

PMO861. Topics in Medical Zoology (1-12 Qtr hrs)

PMO881. Military Preventive Medicine Study Topics (1-12 Qtr hrs)

PMO911. Research in Epidemiology (1-12 Qtr hrs)

PMO926. Health Care Administration Directed Research (1-12 Qtr hrs)

PMO940. Environmental/Occupational Health Directed Studies (1-12 Qtr hrs)

PMO941. Environmental/Occupational Health Directed Research (1-12 Qtr hrs)

PMO942. Environmental/Occupational Health Directed Rotations (1-12 Qtr hrs)

PMO960. Directed Laboratory Research (1-12 Qtr hrs)

PMO962. Directed Clinical Research (1-12 Qtr hrs)

PMO963. Directed Field Research (1-12 Qtr hrs)

PMO964. Research in Medical Zoology (1-12 Qtr hrs)

PMO970. Directed Studies in Preventive Medicine (1-12 Qtr hrs)

PMO972. Great Books Seminar (2 Qtr hrs)

PMO975. Introduction to Aerospace Medicine Seminar (2 Qtr hrs)

PMO990. Travel Medicine Practicum (2 Qtr hrs)

Interdepartmental Course Offerings

IDO501. Electron Microscopic Techniques (4 Qtr hrs)

IDO502. Experimental Statistics (4 Qtr hrs)

IDO503. Experimental Designs (3 Qtr hrs)

IDO505. Molecular Endocrinology (2 Qtr hrs)
IDO507. Cellular and Molecular Biology (4 Qtr hrs)
IDO510. Practicum in Secondary Science Education (3 Qtr hrs)
IDO701. Tutorial in Transmission Electron Microscopy (2 Qtr hrs)
IDO702. Tutorial in Scanning Electron Microscopy (2 Qtr hrs)
IDO703. Tutorial in Freeze-Etching Techniques (2 Qtr hrs)
IDO704. Ethics and the Responsible Conduct of Research (1 Qtr hr)
IDO999. Finalizing Dissertation (12 Qtr hrs)